WATERSHED PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION, AND DRAINAGE

JOHNSON BAYOU WATERSHED

Pointe Coupee Parish, Louisiana

WATERSHED PLAN

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Prepared under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended

Prepared by:

Upper Delta Soil and Water Conservation District
Pointe Coupee Parish Police Jury

With assistance by:

United States Department of Agriculture
Soil Conservation Service
Forest Service

United States Department of the Interior
Fish and Wildlife Service

State of Louisiana
Wild Life and Fisheries Commission
Department of Public Works

April 1976

JOHNSON BAYOU WATERSHED

LOUISIANA

ADDENDUM

WATERSHED PLAN

Phase-In of Principles and
Standards for Planning Water
and Related Land Resources

April 1976

JOHNSON BAYOU WATERSHED

LOUISIANA

CONTENTS OF ADDENDUM

INTRODUCTION

This addendum is based on the Water Resource Council's "Principles and Standards for Planning Water and Related Land Resources," which became effective October 30, 1973. It is prepared to be consistent with the requirements of the Water Resource Council's Procedure No. 1 for the phase-in of the Principles and Standards. The information presented is:

Part I - Benefits to Cost Comparison

An evaluation of the selected plan without reformulation, using current normalized prices, current construction costs, and the current interest rate.

Part II - Four Account Displays

Evaluated effects of the selected plan are displayed under separate accounts for (1) National Economic Development, (2) Environmental Quality, (3) Regional Development, and (4) Social Well-Being. The displays are consistent with the intent of the Principles and Standards.

Part III - Abbreviated Environmental Quality Plan

An environmental quality plan, consistent with the intent of the Principles and Standards, but which is abridged in detail, has been developed by an interdisciplinary team. It is an alternative plan to the selected plan and is formulated to enhance environmental quality by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems. This plan was formulated from information and data obtained during the investigative and analysis phases of project planning. Formulation began with the inventory and recognition of the watershed problems and needs. Desired environmental effects, as translated from the problems and needs, provided a basis for examining appropriate water and land resource use and management opportunities. Opportunities that emphasized contributions to the component needs were selected and are shown as plan elements of the abbreviated environmental quality plan. The expenditure of $985,400 for applying land treatment measures, and $640,000 annually for the installation of the Environmental Quality Plan is a preliminary estimate.

Implementation of features of this environmental quality plan would require acceptance by the local people. Adequate legal authorities do exist for installation; however, funding for all plan elements is presently not available through existing legislative authorities.

JOHNSON BAYOU WATERSHED

Louisiana

Section 1 - Benefit-Cost Ratio of the Selected Alternative

On the basis of a discount rate of 6.125 percent, the total average annual benefits of this project are $585,600. Based on 1975 construction costs, the average annual cost of the project for the selected alternative is $234,000. The ratio of benefits to costs is 2.5:1. Total average annual benefits, excluding external economies, are estimated to be $490,600, providing a benefit-cost ratio of 2.1:1.

SECTION 2

SELECTED ALTERNATIVE
NATIONAL ECONOMIC DEVELOPMENT ACCOUNT
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects Average Annual 1/
Beneficial effects:	
The value to users of increased outputs of goods and services	
A. Flood prevention	$230,300
B. Drainage	220,400
C. Utilization of unemployed and underemployed labor resources	
1. Project construction	34,600
2. Operation, Maintenance, and Replacement	5,300
Total beneficial effects	$490,600
Adverse effects:	
The value of resources required for a plan	
A. Channel work with appurtenant structures	
1. Project installation (structural measures)	$162,700
2. Project administration	26,600
3. Operation, Maintenance and Replacement	44,700
Total adverse effects	$234,000
Net beneficial effects	$173,200

1/ 50 years at 6.125 percent interest

ADDENDUM

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects	
	State of Louisiana	Rest of Nation
	- - - - - - Average Annual 1/ - - - - - -	
A. Income		
Beneficial effects:		
1. The value of increased output of goods and services to users residing in the region		
a. Flood prevention	$230,300	-
b. Drainage	220,400	-
c. Utilization of unemployed and underemployed labor resources-project construction and OM&R	39,900	-
2. The value of outputs to users residing in the region from external economies	95,000	-
Total beneficial effects	585,600	-
Adverse effects:		
1. The value of resources contributed from within the region to achieve the outputs		
a. Multiple-purpose drainage and flood prevention channel work		
1) Project installation	$ 56,300	$106,400
2) Project administration	1,400	25,200
3) OM&R	44,700	0
Total adverse effects	$102,400	$131,600
Net effects	$391,200	-$131,600
B. Employment		
Beneficial effects:		
1. Employment for project construction	78 man-years of local labor over a 4-year period	

1/ 50 years at 6.125 percent interest.

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT (cont.)
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects	
	State of Louisiana	Rest of Nation
2. Employment in OM&R	3 permanent semi-skilled jobs for 50 years	-
Total beneficial effects:	78 man-years of local labor over the project installation period	-
	3 permanent semi-skilled jobs for 50 years	-
Adverse effects:		
1. Decrease in number and types of jobs	-0-	-
Total adverse benefits	-0-	-
Net beneficial effects	78 man-years of local labor over the 4-year project construction period	-
	3 permanent semi-skilled jobs for 50 years	-
C. Population Distribution		
Beneficial effects:	The increased average annual net farm income of about $1,800 should help slow the trends of decreasing number of farms and out-migration. The project will create a need for 78 man-years of local labor over the project installation period and 3 permanent semi-skilled jobs for 50 years.	-
Adverse effects:		
D. Regional Economic Base and Stability		
Beneficial effects:	Flood protection and improved drainage provided by the project will reduce the risks of agriculture, enable increased efficiencies of agricultural production, and bring about increases in farm income. Annual net farm income will increase $367,300. The project will create a need for 78 man-years of local labor over the project installation period and 3 permanent semi-skilled jobs for 50 years in an area which has been classified by the Economic Development Administration as eligible for financial assistance under Title IV because of severely depressed economic conditions.	-
	Flood protection and improved drainage are integral parts of increased farm productivity and improved community life in the project area.	
Adverse effects:		

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Areas of Natural Beauty	1. Seedlings planted in spoil areas as part of the project measure will increase the aesthetic value.
	2. Spoil areas shaped according to design, and vegetated with various grasses will present a pleasing appearance.
	3. Improved agricultural conditions as a result of the project will present attractive pastoral scenes.
	4. Selected trees will be preserved along the channel berm and spoil areas to maintain the natural beauty.
	5. Channel work will conform as close as possible to the present alignment to preserve the natural setting.
	6. Channel areas will be cleared of debris to create a more aesthetically pleasing appearance.
	7. Channel work will be performed from one side. This will preserve as much of the existing conditions as possible.
	8. Disturbance of rights-of-way during construction will create a temporary undesirable appearance.

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects
B. Quality considerations of water, land, and air resources	1. Sediment from sheet erosion over the entire watershed will be reduced from 0.96 ton per acre per year without the project to 0.79 ton per acre per year with the project. This is a reduction of 17 percent.
	2. During construction there will be an increase in air and noise pollution in the immediate area of construction.
	3. Construction will cause some sedimentation.
	4. The reduction in sediment will reduce the amount of pesticides and fertilizers entering aquatic environments.
C. Biological resources and selected ecosystems	1. Right-of-way clearing of 251 acres of forest land will reduce habitat for forest wildlife species.
	2. The conversion of 298 acres of wooded channel bank right-of-way to open land will increase habitat for open land species.
	3. Rabbit habitat along channels disturbed by the project will revert to original carrying capacity following construction as a result of seeding berms and natural reestablishment of vegetation.
	4. Wildlife habitat will be retained, managed, or created on 10,800 acres.

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects
C. Biological resources and selected ecosystems (cont.)	5. The crop and forage base will be maintained and improved.
	6. Channel work will be performed from only one side, thereby retaining much natural vegetation and terrestrial habitat.
	7. Plant succession following construction will be accelerated by planting seedlings.
D. Historical, Archaeological, and Geological	1. No known archaeological or historical sites will be disturbed.
E. Irreversible or Irretrievable Commitments	1. An additional 42 acres of land will be committed to channels.

SECTION 2

SELECTED ALTERNATIVE
SOCIAL WELL-BEING
Johnson Bayou Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Real income distribution	1. The project will create three low to medium income permanent jobs for area residents each year during the 50-year project period.
	2. Regional income benefits of $585,600 will be created. The percent of distribution of this income by income classes is not readily available.
	3. Local costs borne by the region total $100,500. The percent of distribution of this cost by income classes is not readily available.
B. Life, health, and safety	1. Out-of-bank flow will be reduced 70 percent, thereby reducing flood damages accordingly.

SECTION 3

ENVIRONMENTAL QUALITY PLAN
(Abbreviated)

ENVIRONMENTAL PROBLEMS

Flooding and inadequate drainage are the two principle problems in this watershed which impair the quality of the land and water resources. These problems occur on approximately 49,000 acres of open land. Sediment, trash, and litter deposited by floodwater reduce the natural beauty of the area. Soil erosion, caused by runoff, results in gullies and other areas that are aesthetically undesirable. Water quality is reduced during periods of excess runoff due to the transport of sediment in channel flows. Such sediment detracts from the visual quality of the surface water resource and temporarily diminishes the suitability of the resource for fish habitat and other aquatic populations. Water that persists after high water recedes becomes stagnant and oftentimes odorous. It harbors mosquitoes and becomes a potential source for other vectors.

The conversion of forest land to cropland has caused a loss in both game and nongame species of wildlife. Loss of forest land has resulted in a loss of habitat for white-tailed deer, squirrels, swamp rabbits, wild turkeys, and many nongame forest wildlife species. Forest land conversion is, however, creating habitat for bobwhite quail, mourning doves, cottontail rabbits, and nongame species, but these open land species are limited in number due to the "clean farming" associated with intensive crop production. When crops are harvested, what wildlife cover exists is totally and suddenly removed leaving cover only along fence rows, drainage ditches, and in scattered odd areas. An estimated 4,600 acres of forest land is expected to be converted to open agricultural land in the future without project action.

Trash dumping and littering is a problem in scattered areas. This is aesthetically undesirable, unsanitary, and conducive to stream pollution.

COMPONENT NEEDS

Environmental component needs for the watershed consist of floodwater damage reduction and improved drainage on some of the agricultural land, sediment and erosion reduction, fish and wildlife habitat improvement and development, forest land preservation, and proper waste disposal.

PLAN ELEMENTS

The elements of this Environmental Quality Plan give consideration to the previously specified components of the environmental quality objective. Conservation land treatment measures which could be applied include conservation cropping systems, drainage mains and laterals, drainage field ditches, drainage land grading, crop residue management, pastureland and hayland management and planting, forest land management including wildfire control, and wildlife wetland and upland habitat management. The measures applicable to cropland and pasture could be installed on these areas that are at the higher elevations or that have sufficient channel outlets for on-farm drainage systems. The total proposed land treatment program could be installed on 23,000 acres at a cost of about $885,400.

Upland wildlife habitat could be developed and improved by establishing occasional hedgerows across open fields and plantings beneficial to wildlife in odd or unused small areas of farms and other tracts of land. A program of this nature, on 1,000 acres, would cost approximately $100,000. This program would undoubtedly require economic inducements provided to land users to get them to participate.

An estimated 23,600 acres of cropland and pastureland on the more poorly-drained soils could be converted to pastureland or allowed to revert to bottom land hardwoods. An estimated 9,100 acres of cropland could be converted to pastureland and 14,500 acres of pastureland could revert to forest land. This land use change would result in an estimated annual loss of $490,000 in net returns to land users. This would also require economic inducements to get land users to participate.

The problem of trash dumping and littering could be alleviated by enacting and enforcing ordinances and conducting public campaigns against dumping and littering. Large waste receptacles could be placed throughout the parish and emptied regularly. Additional sanitary landfills could also be established for a wider distribution of waste disposal. This program is estimated to cost $150,000 annually.

Institutional Arrangements Available and Needed for the Implementation of the Environmental Quality Plan (EQ Plan)

Legal entities of government exist which would enable implementation of the Environmental Quality Plan. These include parish government and joint powers of parish government and soil and water conservation districts.

Private, State, and Federal programs are available to provide financial and technical assistance for both land acquisition and the establishment of measures included in the Environmental Quality Plan.

ENVIRONMENTAL EFFECTS

Areas of Natural Beauty

This plan will visually improve the landscape through improved vegetation and less weeds and undesirable vegetation. Areas of erosion will also be minimized or eliminated.

Quality Consideration of Water, Air, and Land Resources

The plan will reduce sediment borne by the water. Soils used within their capability will minimize erosion. Water quality will be improved by the installation of land treatment measures and other plan elements.

Biological Resources and Selected Ecological Systems

Installation of land treatment measures will retain and/or improve upland habitat for both game and nongame species which will increase the potential populations of these animals. Wetland wildlife habitat will be improved and managed which will provide the potential for increasing fish and wildlife species associated with this habitat type.

Habitat for forest wildlife will be improved by the conversion of cropland and pastureland on the poorly-drained or frequently-flooded soils to forest land. This action will also result in a loss of habitat for open land wildlife species.

Irreversible and Irretrievable Effects

The expenditure of $985,400 for applying land treatment measures and $640,000 annually for the installation of the Environmental Quality Plan would be an irretrievable effect. The annual costs include $490,000 in annual net returns foregone because of decreased agricultural production.

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WATERSHED PLAN AGREEMENT

between the

UPPER DELTA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

POINTE COUPEE PARISH POLICE JURY
Local Organization

(hereinafter referred to as the Sponsoring Local Organization)

State of Louisiana

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Johnson Bayou Watershed, State of Louisiana, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666) as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Johnson Bayou Watershed, State of Louisiana, hereinafter referred to as the watershed plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed plan, and further agree that the works of improvement as set forth in said plan can be installed in about 10 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed plan:

1. The Pointe Coupee Parish Police Jury will acquire, with other than Public Law 566 funds, such land rights as will be needed in connection with installation of structural measures (estimated cost, $369,700).

2. The Pointe Coupee Parish Police Jury assures that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition to policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Pointe Coupee Parish Police Jury and the Service as follows:

	Pointe Coupee Parish Police Jury	Service	Estimated Relocation Payment Costs
	(percent)	(percent)	(dollars)
Relocation Payment	64	36	-0-a/

a/ Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the structural measures.

4. The percentages of construction costs of structural measures to be paid by the Pointe Coupee Parish Police Jury and by the Service are as follows:

Works of Improvement	Pointe Coupee Parish Police Jury	Service	Estimated Construction Cost
	(percent)	(percent)	(dollars)
Channel Work	25	75	2,010,500

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization	Service	Estimated Construction Cost
	(percent)	(percent)	(dollars)
Channel Work	0	100	140,600

6. The Pointe Coupee Parish Police Jury and the Service will each bear the costs of Project Administration which it occurs, estimated to be $22,120 and $390,180, respectively.

7. The Upper Delta Soil and Water Conservation District will provide assistance to land users to assure the installation of the land treatment measures shown in the watershed plan.

8. The Upper Delta Soil and Water Conservation District will encourage land users to install and maintain the land treatment measures for the protection and improvement of the watershed.

9. The Pointe Coupee Parish Police Jury will be responsible for the operation and maintenance of the structural measures by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

11. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed plan is contingent on the appropriation of funds for this purpose.
A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific structural measure.

12. The watershed plan may be amended or revised, and this agreement may be modified or terminated only by mutual agreement of the parties hereto except for cause. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organization has failed to comply with the conditions of this agreement. The Service shall promptly notify the Sponsoring Local Organization in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organization or recoveries by the Service under projects terminated for cause shall be in accord with the legal rights and liabilities of the parties.
An amendment to incorporate changes affecting one specific structural measure may be made by mutual agreement between the Service and the Sponsor having specific responsibilities for the particular structural measure involved.

13. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

14. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Acts of 1964, and the regulations of the Secretary of Agriculture (7 C.F.R.15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

15. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

AGREEMENT

UPPER DELTA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By Richard S. Flynn

Title Chairman

Post Office Box A
New Roads, Louisiana 70760
Address Zip Code

Date March 16, 1976

The signing of this agreement was authorized by a resolution of the governing body of the Upper Delta Soil and Water Conservation District
Local Organization
adopted at a meeting held on March 16, 1976

Secretary, Local Organization

Post Office Box A
New Roads, Louisiana 70760
Address Zip Code

Date March 16, 1976

POINTE COUPEE PARISH POLICE JURY
Local Organization

By Adam J. Martin

Title President

Post Office Box J
New Roads, Louisiana 70760
Address Zip Code

Date March 9, 1976

The signing of this agreement was authorized by a resolution of the governing body of the Pointe Coupee Parish Police Jury
Local Organization
adopted at a meeting held on

Hazel L. Powers
Secretary, Local Organization

Post Office Box J
New Roads, Louisiana 70760
Address Zip Code

Date March 9, 1976

AGREEMENT

Appropriate and careful consideration has been given to the environmental impact statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service

United States Department of Agriculture

Approved by:

Allan McArthur

State Conservationist

4/28/76

Date

WATERSHED PLAN
JOHNSON BAYOU WATERSHED
Pointe Coupee Parish, Louisiana
November 1975

SUMMARY OF PLAN

The watershed contains 81,700 acres (128 square miles) in the most northerly portion of Pointe Coupee Parish in south central Louisiana. The Sponsors are the Pointe Coupee Parish Police Jury and the Upper Delta Soil and Water Conservation District. Technical assistance was furnished by the Soil Conservation Service and Forest Service of the U.S. Department of Agriculture, the Fish and Wildlife Service of the U.S. Department of the Interior, and the Wild Life and Fisheries Commission and the Department of Public Works of the State of Louisiana.

The major problems considered in this plan are flooding and poor drainage. They occur, in varying degrees, on the 49,000 acres shown as benefited areas on the Project Map (Figure 6). They cause excessive damages and increased crop production costs, restricted crop yields and quality, inconveniences, and health problems. Increased drainage and flood protection, which would allow the land to produce near its full potential, can be furnished only by comprehensive channel work.

Analyses of the merits of various levels of agricultural protection were made. A 3-year level of flood protection and drainage was chosen after economic, environmental, and social effects had been carefully analyzed. Although damages from a 3-year storm will be minimal with project conditions, some out-of-bank flow will occur in benefited areas. The duration of flooding will not be long enough to seriously impair agricultural production. Average annual damages in agricultural areas will be reduced about 70 percent.

The Sponsors selected 128 miles of existing channels for study. Approximately 113 miles (88 percent) of these are classified as manmade or previously-modified channels and 15 miles (12 percent) are unmodified, well-defined natural channels. One system involving 17 miles of channels in the ridge and slough area of the northeastern section of the watershed was subsequently eliminated due to conflicting environmental considerations. As surveys progressed, a need was determined for 5 miles of new channels. This resulted in a total of 116 miles included for design considerations.

When field surveys and designs were made on the 116 miles of design study channels, it was found that various segments of various channels were adequate in their present condition. Consequently, 27 miles, requiring no work, were eliminated leaving 89 miles that will require work. This includes 64 miles (72 percent) with ephemeral flow, 17 miles (19 percent) with intermittent flow, 3 miles (3 percent) with ponded water, and 5 miles (6 percent) are nonexisting or have practically no defined channels. There are no perennial streams in this watershed.

Channel work and appurtenant structures will cause approximately 411 additional acres of land to be committed to rights-of-way. Approximately 42 additional acres will be in channels, 175 additional acres will be in berms, and 194 additional acres will be in spoil. About 58 acres of additional rights-of-way in forest land will be cleared. Right-of-way disturbances will cause decreases in most forest wildlife species and increases in most open land wildlife species. To minimize adverse effects, spoil in forest land will be planted with seedlings of hardwood species that are valuable to wildlife. Project induced clearing would result in an estimated loss of 500 acres of forestland.

Damages to fish and wildlife habitat will be offset, in part, by installation of eight structures for water control (weirs). They will create approximately 26 miles (99 acres) of ponded water which will provide habitat for fish and wildlife. These structures will reduce sediment in downstream channels and reduce growth of vegetation in upstream channels. Structures for water control (pipe drops) will be installed as channel appurtenances.

Approximately 700 persons in farm households will benefit from increased income generated by the project. The other 3,200 watershed residents, as well as residents of the surrounding area, will benefit from increased economic activity generated by project works and direct benefits.

The plan proposes an installation period of 4 years for structural measures and 10 years for land treatment measures. The total installation cost is estimated to be $6,795,900, of which Public Law 566 funds will bear $2,447,055 (about 36 percent) and $4,348,845 (about 64 percent) will be borne by Other funds.

Land users cooperating with the Upper Delta Soil and Water Conservation District will install land treatment measures that reduce floodwater and sediment damages and improve drainage conditions. The effectiveness of these measures on open land is dependent, to a large extent, on the installation of project channels. The cost of land treatment measures is estimated to be $3,862,800. Of this total, Public Law 566 funds will provide $408,400 and Other funds will provide

$3,454,400. Land users, with aid from Federal and State programs, will bear the cost of applying land treatment measures. The estimated cost of structural measures is $2,933,100, of which Public Law 566 funds will bear $2,038,655 and Other funds will bear $894,445.

Average annual benefits are estimated to be $585,600, including $95,000 of annual external economies. The estimated average annual cost, which is the sum of amortized installation costs and operation and maintenance costs, is $234,000. The benefit-cost ratio is 2.5 to 1.

Land users will maintain land treatment measures on their farms. The Sponsors will operate and maintain structural measures. Estimated annual operation and maintenance cost of structural measures based on current prices is $44,700.

The Louisiana Department of Public Works has agreed to share in the local cost of installing the structural measures contingent on the appropriation of funds for this purpose by the Louisiana Legislature. The Sponsors recognize additional funds may be needed to finance project installation and will be responsible for obtaining additional financing as necessary.

The U.S. Army Corps of Engineers plan to install a pumping plant that will serve as the primary outlet for the Johnson Bayou Watershed. The Corps' project referred to as the Upper Pointe Coupee Loop Area and the watershed project are interdependent and must function in concert in order for the mutual benefits of both projects to be realized. This pumping plant will be installed concurrently with or prior to the installation of structural measures.

WATERSHED RESOURCES - ENVIRONMENTAL SETTING 1/

Physical Data

Johnson Bayou Watershed encompasses about 81,700 acres, or about 128 square miles in the most northerly portion of Pointe Coupee Parish, Louisiana. The watershed is unusual in that it is completely surrounded by levees, a system designed to protect the area from flooding by both the Mississippi and Atchafalaya Rivers. Historically, the major portions of this area flooded each time these rivers reached flood stage. Over the years, various State and Federal agencies have assisted in building the levees to protect the inhabitants of the watershed. The levee system does an adequate job of protecting the watershed from external floods, but agricultural lands within the watershed have a flooding and drainage problem caused by direct precipitation.

There are no incorporated towns in the watershed; however, there are numerous small communities located on the higher lands throughout the area. Some of these communities are Legonier, Lettsworth, Innis, Batchelor, and McCrea. Morganza, Simmesport, and Melville, located within 5 miles of the watershed, have populations of less than 2,500. New Roads, the parish seat, and Baton Rouge, the State Capital are located 15 miles and 45 miles, respectively, to the southeast.

Several State highways, especially Highway 1, and parish roads provide access between points inside the watershed and to points outside.

The average annual rainfall of 55 inches at Melville, Louisiana is distributed by seasons as follows: winter, 16 inches; spring, 15 inches; summer, 13 inches; fall, 11 inches. The average temperature is 68 degrees Fahrenheit. The average monthly temperature ranges from 52 degrees in January to 82 degrees in July.2/ The average frost-free period of 250 days extends from March 8 to November 13.3/

1/ All information and data, except as otherwise noted by reference to source, were collected or compiled during Watershed Planning investigations by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

2/ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climatological Data, Louisiana (Asheville: National Oceanic and Atmospheric Administration, 1975) Vol. 75 No. 13, pp. 1, 3.

3/ U.S. Department of Agriculture, Climate and Man - 1941 Yearbook of Agriculture (Washington: U.S. Government Printing Office, 1941), pp. 900-901.

The topography is generally flat, ranging from nearly level to very gently sloping; only a small amount of the area has slopes exceeding 1 percent. Almost all the land lies between elevations 25 and 50 feet above mean sea level. Variations in the generally flat surface result from old scour channels and natural levees along present streams and abandoned river channels.

The watershed is in the Atchafalaya River Basin of the Southern Mississippi Valley Alluvium Major Land Resource Area.4/ This area was formed from recent sedimentary deposits of the Quaternary System.5/

The original vegetation was dense hardwood forest. It is typical of other flatland watersheds in the alluvial valley of this region.

Flooding and drainage problems are similar to those of almost all flatland areas. Approximately 49,000 acres of agricultural land have crops and pasture damaged by flooding and poor drainage which are the results of inadequate channels. Road and bridge damages occur on inadequate channels.

Because soils are important in all land use planning, they are grouped in accordance with the land capability classification system. This system shows, in a general way, the suitability of soils for most kinds of field crops.

Capability Classes, the broadest group, are designated by Roman numerals I through VIII. Class I soils have few limitations, a wide range of uses, and the least risk of damage. The soils in class II through class VIII have progressively greater natural deficiencies that limit their uses.6/

Capability Subclasses are groups of soils within Capability Classes with the same dominant limitations for uses as a result of soil and climate. Some soils are subject to erosion if they are not protected, while others are naturally wet and must be drained if crops are to grow. These are designated by adding the small letter "e" for erosion hazards and "w" for wetness hazards.7/

4/ U.S. Department of Agriculture, Land Resource Regions and Major Land Resource Areas of the United States, Handbook No. 296 (Washington: U.S. Government Printing Office, 1965), p. 59.

5/ Rufus J. LeBlanc, Geologic Map of Louisiana, a map compiled from several sources of data, Baton Rouge, Louisiana, 1948.

6/ U.S. Department of Agriculture, Soil Conservation Service, Land Capability Classification, Agricultural Handbook No. 210 (Washington: U.S. Government Printing Office, 1961) pp. 6-10.

7/ Ibid., pp. 10-11.

The principal soil associations are Commerce-Mhoon, Sharkey, Sharkey-Tunica, Sterlington-Norwood, and Commerce-Mhoon-Convent.8/ They are high in natural fertility and respond well to recommended fertilizers. See General Soil Map on page 7.

The Commerce-Mhoon association covers about 21 percent of the watershed. This association consists of poorly to somewhat poorly-drained nearly level, loamy soils. They are easy to work and to keep in good tilth, but they are likely to become cloddy if worked when wet. They are high in natural fertility; however, this does not preclude the need for fertilizers. They are well suited to most agronomic and pasture plants. These soils are in Capability Subclass IIw.

Drainage is generally the main management problem. Drainage land grading or smoothing would improve drainage and increase efficiency in use of farm equipment. There is no restriction in cropping sequence provided that crops are adequately fertilized and crop residue management is applied.

The Sharkey association, which covers about 41 percent of the watershed, consists of poorly-drained, level, clayey soils. Good tilth is difficult to maintain because of wetness and soil texture. Sharkey soils swell and seal over when wet, become hard and crack when dry, and become cloddy when worked. They are high in natural fertility and are well suited to a limited variety of crops and to a wide range of pasture plants. These soils are in Capability Subclass IIIw.

Removing excess surface water is the main management problem. Drainage land grading and smoothing would aid in improving drainage and increasing the efficiency of farm equipment, but the soil material is difficult to handle. There is no restriction on the cropping sequence, provided crops are adequately fertilized and crop residue management is practiced.

The Sharkey-Tunica association covers about 9 percent of the watershed. It consists of poorly-drained clayey soils that occur on short irregular slopes in a ridge-swale pattern. The cultivation of row crops is difficult because of the short irregular slopes, the narrow wet swales, and the surface texture. The soils are high in natural fertility and are suited to pasture plants. This association is in Capability Subclass IIIw.

8/ U.S. Department of Agriculture, Soil Conservation Service, "Pointe Coupee Parish," General Soil Map, (Fort Worth: Cartographic Unit, South Regional Technical Service Center, 1970).

SOIL ASSOCIATION

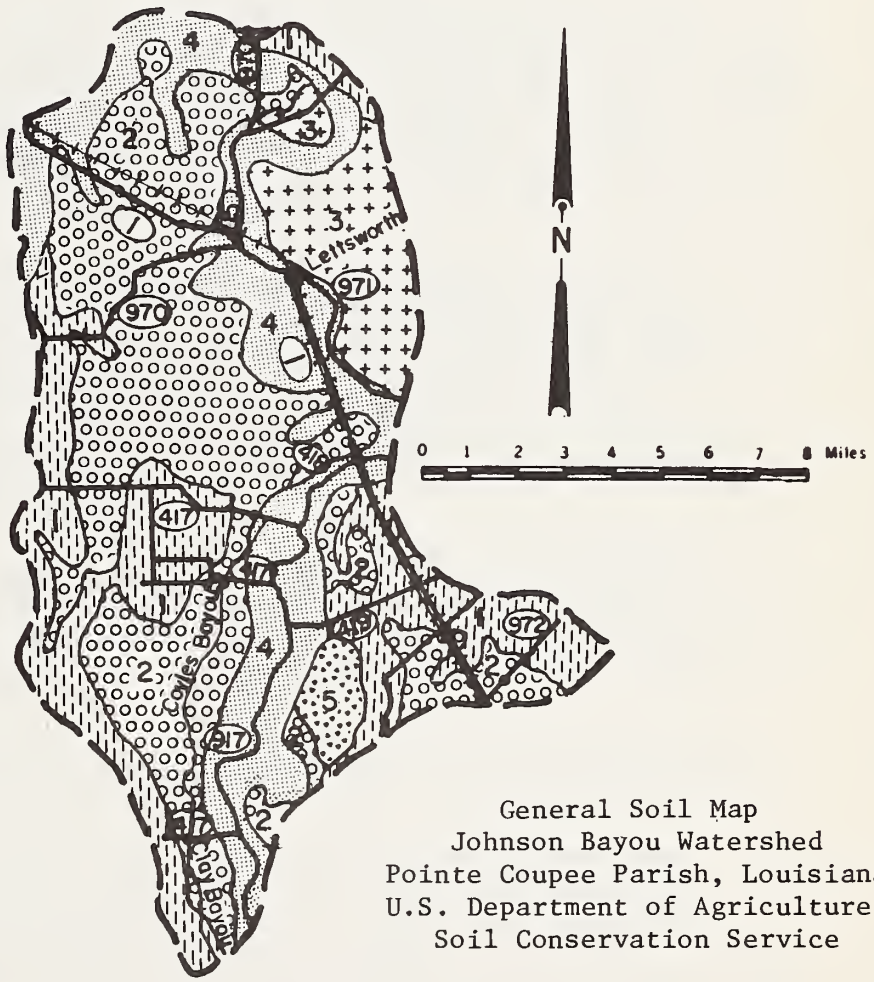
1 - Commerce-Mhoon Association

2 - Sharkey Association

3 - Sharkey-Tunica Association

4 - Sterlington-Norwood Association

5 - Commerce-Mhoon-Convent Association



General Soil Map
Johnson Bayou Watershed
Pointe Coupee Parish, Louisiana
U.S. Department of Agriculture
Soil Conservation Service

Compiled from SCS General
Soil Map of Pointe Coupee
Parish

April 1976

Controlling runoff from the slopes and removing excess water from the swales are the main management problems. Drainage land grading and land smoothing would improve drainage, reduce the erosion hazard, and make it easier to operate farm equipment; but large amounts of earth would have to be moved, and the soil material is difficult to handle.

The Sterlington-Norwood association comprises about 26 percent of the watershed. This association consists of well-drained, loamy soils. These soils are friable and fairly easy to keep in good tilth. The supply of moisture is adequate for cultivated crops and pasture plants in most years. Air and water movement within the soils is good. This association is in Capability Subclass I.

Crops on these soils respond well to fertilizers, and there is no restriction on sequence provided crops are adequately fertilized and crop residue management is applied. A plow pan, the main management problem, tends to form in cultivated areas, but can be broken by chiseling or deep plowing. Drainage land grading or land smoothing will improve surface drainage and increase the efficiency of farm equipment, especially multirow equipment.

The Commerce-Mhoon-Convent association comprises about 3 percent of the watershed. This is an area of poorly or somewhat poorly-drained loamy soils which occur on short, irregular slopes in a ridge-slough pattern. Cultivation of row crops is difficult because of the short irregular slopes, the narrow wet swales, and the variable surface textures. Hay generally can be harvested from the pastures during periods of peak growth. This association is in Capability Subclass IIIw.

Removing excess water from the swales is the main management problem. Drainage land grading and land smoothing would improve the drainage, reduce the hazard of erosion, and increase the efficiency in use of farm equipment, but a large amount of earth would have to be moved.

While there is oil, gas, and clay production in Pointe Coupee Parish, there is no mineral production within this watershed.

Large quantities of fresh ground water are available from underlying alluvial sands which range in thickness from 20 feet to more than 100 feet. Wells may yield as much as 1,500 gallons per minute. Generally, the water quality improves with depth. Wells less than 400 feet in depth usually yield a calcium bicarbonate type water that is hard and high in iron. Deeper wells (400 to 1,200 feet) usually yield a softer, sodium bicarbonate water.9/

9/ Water Resources of the Lettsworth-Innis-Batchelor Area, Pointe Coupee Parish, Louisiana, Water Resources Pamphlet No. 21, Department of Conservation, Louisiana Geological Survey, Louisiana Department of Public Works, Baton Rouge, Louisiana 1968.

The village of Innis obtains its public water supply from a 4-inch well screened in the Pliocene. The well averages 10,000 gallons per day. The well was drilled to a total depth of 1,462 feet, but the screen was set between 991 feet and 1,031 feet. The following tabulation is a chemical analysis of the water from this well.

Chemical Analysis of Water from Well at Innis
(Results in parts per million except as indicated

Silica (SiO_2)	21	Dissolved solids:	
Iron (Fe) a/	.05	Calculated (Sum)	261
Iron (Fe) b/	.07	Reside on evaporation at 180°C	261
Manganese (Mn)	.01	Hardness as $CaCO_3$	6
Calcium (Ca)	2	Noncarbonate hardness	0
Magnesium (Mg)	.2	Percent Sodium	96
Sodium (Na)	98	Specific Conductance	
Potassium (K)	1.5	(Micromhos at 25°C)	410
Bicarbonate (HCO_3)	221	Color c/	20
Carbonate (CO_3)	12	Carbon Dioxide (CO_2), Calculated	-
Sulphate (SO_4)	9	pH (Lab.) c/	8.7
Chloride (Cl)	5.8	pH (field) c/	8.9
Fluoride (F)	.7	Temperature (°F)	77
Nitrate (NO_3)	1.5		
Phosphate (PO_4)	.8		
Boron (B)	.13		

a/ In solution at time of analysis.
b/ Total amount of iron in sample; presumable in solution when collcted.
c/ Not in ppm.

Cropland acreages are the largest of the watershed, followed by forest land and pastureland. The tabulation on page 10 shows present acreages and percentages of land use by major categories.

Before farming became prominent in the watershed area, the ground cover was forest. The natural drainage system consisted of a pattern of bayous and wide, shallow natural depressions. As the demand for food and fiber generated more interest in farming, a drainage improvement program was initiated which included enlarging and clearing out these natural depressions. Most of the channels that comprise the present drainage system have previously been dug, and in many cases, more than once. The geometric configuration and alignment of the water courses have been altered. Cleaning of these channels for the past 50 years has resulted in the present outlet system of manmade "drainage ditches."

Present Land Use

Land Use	Acres	Percent
Cropland	30,800	38
Pastureland	20,700	25
Forest Land	22,800	28
Other Land a/	7,400	9
Total	81,700	100

a/ Includes roads, channels, bayous, lakes, communities, and farmsteads, etc.

This entire drainage system flows southerly and reaches a confluence at the southwest tip of the watershed, where the water must flow through a single outlet in the Upper Morganza Guideline levee. This outlet is the Upper Pointe Coupee Drainage Structure, which was installed by the U.S. Corps of Engineers. From this structure, the water flows into an outlet channel to Bayou Latenache to Alabama Bayou and into the Atchafalaya River. When backwater flooding occurs from the Atchafalaya River, or the Morganza Floodway is in use, the drainage structure must be closed to prevent the floodwater from backing into the watershed. At the same time, internal floodwaters must be held within the watershed until the external floodwaters recede enough to open the drainage structure.

An inventory of the existing drainage system was made to determine the type of channels and flow characteristics. The inventory showed that 94 percent by length is manmade or previously modified; 6 percent is in a natural, unmodified condition. Eighty percent has ephemeral flow characteristics, 16 percent has intermittent flow, and 4 percent has ponded water. There are no perennial streams in the watershed.

There are 9,295 acres of land that are classified as "wetlands" using the description in U.S.D.I. Circular No. 39.10/ These categories are listed in the tabulation on page 11.

10/ U.S. Department of the Interior, Fish and Wildlife Service, Wetlands of the United States, Circular No. 39 (Washington: U.S. Government Printing Office, 1956), pp. 20-22.

Type	Description	Acres
1	Seasonally flooded basins or flats	7,470
5	Inland open freshwater	300
6	Shrub swamps	530
7	Wooded swamps	995
	Total	9,295

The majority of the Type 1 wetlands are located east of Johnson and Marine Bayous in the southwestern portion of the watershed. Wetland Types 6 and 7 are located in the northeastern area of the watershed near Letsworth. The Type 5 wetlands are shallow ponds that are scattered throughout the watershed.

Economic Data

The industries of a region can be grouped into three broad categories. Basic industries such as farming, mining, and forestry use natural resources to make materials available for processing and consumption. Processing and manufacturing industries such as cotton gins, grain elevators, petroleum refining plants, and lumber mills alter materials from the basic industries to make useful products. Service industries such as merchandising, transportation and medicine provide goods and services to consumers.

Pointe Coupee Parish census data for 1970 was used to determine that 26 percent of the employed labor force were engaged in basic industries, which includes 15 percent in agriculture, forestry, and fisheries and 1 percent in mining. Of the remaining 74 percent of the employed labor force, 29 percent were employed in the processing and manufacturing industries, and 55 percent were employed in the service industries.

The watershed population in 1970, estimated to be 3,900, was considered all rural. Approximately 18 percent of the population of Pointe Coupee Parish live in the watershed, and approximately 26 percent of the rural populations of the parish live in the watershed. In 1970, Pointe Coupee Parish had about 12 percent unemployment. The parish median family income was about $4,930.11/

11/ U.S. Department of Commerce, Bureau of the Census, Census of Population: 1970, General and Social and Economic Characteristics, Final Report PC(1)-C20, La. (Washington: U.S. Government Printing Office, 1972).

The major farm and ranch enterprises are soybeans, cotton, corn, wheat, grain sorghum, and cattle. Industries related to agriculture include cotton gins, grain elevators, flying services, feed mills, and retailing of supplies and equipment.

Crop acreages in the problem area include approximately 28,800 acres of soybeans, 200 acres of cotton, 1,100 acres of corn, 2,000 acres of grain sorghum, and 200 acres of double-cropped wheat. Land used for beef production consists of 16,900 acres of permanent pasture and 200 acres of overseeded supplemental ryegrass.

The 22,800 acres of forest land is divided into the following ownerships: 37 percent industrial; 1 percent public; and 62 percent private. The area is accessible only by logging roads. There is extreme difficulty with construction of logging roads due to wet conditions.

Most of the forest has been repeatedly cut over with little regard for future management. The cutting practices have resulted in stands composed of poor form and quality.

The Louisiana Forestry Commission, through the various Federal-State cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock and forest pest control assistance to private land users in the watershed.

Data from the 1969 Census of Agriculture was used in estimating that the watershed contains 200 farms averaging 350 acres. Approximately 136, or 68 percent, are owned and operated by families living on the farms.

Agricultural land values in the watershed range between $500 and $1,000 per acre. The values depend on location and soil capability.

The public bodies owning land in the watershed, other than small building lots, are the Atchafalaya Basin Levee District (480 acres), and the Pointe Coupee Parish Police Jury (70 acres).

The watershed is in the Lower Mississippi Region Comprehensive Study Area. Data used in this plan were coordinated with data used in the study report.

There are approximately 130 miles of State and parish roads in the watershed. About 70 miles are hard surfaced and 60 miles are graveled. Parts of some roads are flooded after heavy rains; otherwise, farm-to-market roads are adequate. The railroad company providing service has loading facilities at several points.

Fish Resources

The commercial fishery in the project area is of moderate value and the sport fishery is of low value. Borrow pits occurring along the Upper Morganza Guide Levee, natural lakes, eight farm ponds, and 5 miles of ponded water channels contain the major fisheries. Of lesser importance are 19 miles of intermittent flow channels, and several high bank bayous containing extremely shallow water. A list of fish species occurring in the watershed is found on page 17. From available literature, there appears to be no "threatened" fish species in the project area.12/

The 5 miles of ponded water channels contain a fisheries composed primarily of commercial species including gizzard shad, channel catfish, carp, buffalo, and bowfin. The borrow pits were selected for rotenone sampling because they appear typical of the lake and ponded water fisheries. Sampling was jointly done with personnel of the Louisiana Wild Life and Fisheries Commission. Twenty-two species of fish were collected. Gizzard shad represented 71 percent of the total poundage. Although the game fish poundage was low, seven species were present. The standing crop was 503 pounds per acre. Details of the samples can be found on page 15.

Intermittent flow channels (19 miles) have a moderate fishery. Johnson Bayou, an intermittent channel, was sampled 4 miles above the outlet during May 1975. The results of the rotenone sample showed a standing crop of 86 pounds per acre. Fourteen species of fish were collected at this site. Commercial species such as channel catfish and carp were more numerous. The detailed sample data is found on page 16.

Ephemeral flow channels (92 miles) have a limited fishery. These channels are important to the production of fish food organisms such as crustaceans, amphibians, and larval forms of insects.

The Louisiana Stream Control Commission has established quality standards for certain streams and water bodies within the State. However, no quality standards have been established for any water body in the watershed. The Soil Conservation Service has been collecting water samples at three locations. These locations are Johnson Bayou, Fisher Bayou, and the borrow pits near the outlet. Collection of samples started in February 1975 continued through July 1975. The tabulation on page 18 gives the results of the sampling.

12/ Robert R. Miller, "Threatened Freshwater Fishes of the United States," Transactions of American Fisheries Society No. 2 (Kansas: Allen Press, 1972), pp. 239-252.

A limited amount of data on pesticides is available for the project area. The tabulation on page 19 gives residue levels from mussels and various species of fish collected during September of 1972 and 1973.13/ None of the residue levels exceeded the tolerance limits (5 ppm) for DDT and metabolites. No tolerance limits have been established for toxaphene, but the suggested limits are 5 ppm for the edible parts. White crappie collected in September 1973 contained 12.7 ppm toxaphene. The tolerance limit for Mirex is .01 ppm for the edible parts. Three samples out of the 11 collected to date contained .01 ppm Mirex, but none exceeded the tolerance limits. Additional samples were taken in March 1976 to verify if toxaphene levels are currently above the 5 ppm suggested tolerance limits. Six species of fish, including largemouth bass, spotted gar, white crappie, gizzard shad, black crappie, and freshwater drum were collected and analyzed for chlorinated hydrocarbons. Four of the six species are considered predators, one a plankton eater and one a bottom feeder. Toxaphene levels ranged from a low of .41 ppm in the black crappie to 5.40 ppm in the spotted gar. Of the six species only the spotted gar sample was over the suggested tolerance limits of 5 ppm. Considering DDT and metabolites, black crappie had the lowest amount (.11 ppm) and spotted gar had the highest (2.70 ppm). See the tabulation on page 20 for the detailed results of the six composite samples.

Wildlife Resources

Forest land habitat comprises about 22,800 acres, and the entire acreage is in bottom land hardwoods. This vegetative community represents the primary habitat for the three big game animals present which include white-tailed deer, wild turkey, and black bear. Small game species associated with the forested habitat include the gray and fox squirrel, woodcock, mallard, wood duck, swamp and cottontail rabbit. Numerous nongame animals utilize the forested areas for food, cover, and nesting requirements. The current estimated populations of game animals are listed on page 21.

Open land, which includes cropland and pastureland, totals 51,500 acres. Open land game species include the mourning dove, bobwhite quail, and cottontail rabbit. Several species, such as woodcock and wild turkey, use more than one habitat type. Several species of fur-producing animals occur that utilize open land, forest land, and wetlands. These include raccoon, mink, nutria, otter, and muskrat.

13/ Unpublished sampling data. Louisiana Wild Life and Fisheries Commission.

Johnson Bayou Watershed a/
Fish Sampling Data

Species	Fish in Available Size: Min. Length	Number /Acre	Pounds /Acre	Intermediate: Range in Length	Number /Acre	Pounds /Acre	Fingerlings: Max. Length	Number /Acre	Pounds /Acre	Total Lbs. Percent
PREDATORY GAME FISH										
Largemouth bass							4.9	7.5	T	.01
Yellow bass	6	.5	.1							.02
White crappie	7	4.5	1.8	5.0- 6.9	1.5	.15	4.9	8	.25	.44
Black crappie	7	1	.55	5.0- 6.9	2.5	.3	4.9	1	T	.01
Total		6	2.45		4.0	.45		16.5	.25	
NON-PREDATORY GAME FISH										
Bluegill	5	31	4.5	3.0- 4.9	4.5	.3	2.9	10.5	T	.95
Redear sunfish	5	3.5	1.2	3.0- 4.9						.24
Spotted sunfish	5	3.5	.5	3.0- 4.9	5.5	.3	2.9	12	T	.15
Total		38.0	6.2		10.0	.6		22.5	T	
NON-PREDATORY FOOD FISH										
Carp	14	6.5	23.1	7.0-13.9	22	17.3				8.03
Drum	10	.5	.2	5.0- 9.9	2.5	.35				.10
Smallmouth buffalo				5.0-15.9	3.0	2.25				.45
Bigmouth buffalo	16	3.5	13.4	5.0-15.9	17.5	29.05				8.44
Black buffalo				5.0-15.9	3	2.1				.42
Yellow Bullhead	7	.5	.15							
Total		11.0	36.85		48.0	51.05				
PREDATORY FOOD FISH										
Channel catfish	10	17	6.20	5.0- 9.9	8.5	1.85				1.6
Blue catfish		3	1.3		5.5	1.1				.48
Longnose gar	26	1	2.4	7.0-25.9	1	.8				.64
Shortnose gar	24	1	2.1	7.0-23.9	19.5	14.0				3.20
Bowfin	14	6.5	14.6	5.0-13.9	.5	T				2.90
Total		28.5	26.6		35.0	17.75				
FORAGE FISH										
Gizzard shad	8	843.5	124.6	4.0- 7.9	2468	234.5				71.40
Threadfin shad				4.0- 5.9	100	1.4				.27
Striped mullet	.5		.25							.05
Miscellaneous minnows							3.9	9.5	T	
Total		843.5	124.85		2568	235.9		9.5	T	
GRAND TOTAL			196.95			305.75			.25	

Standing Crop = 503 pounds per acre

a/ Morganza Floodway West Guide Levee - Average of 2 one acre sets.

November 1975

Fish Sampling Data a/

Species	Fish of Available Size: Min. Length	Number /Acre	Pounds /Acre	Intermediate: Range in Length	Number /Acre	Pounds /Acre	Fingerlings: Max. Length	Number /Acre	Pounds /Acre	Total Lbs. Percent
PREDATORY GAME FISH										
White crappie	7	2	0.8	5.0- 6.9				None		0.9
Black crappie	7	3	0.6	5.0- 6.9	3	0.4				1.2
Total		5	1.4		3	0.4				2.1
NON-PREDATORY GAME FISH										
Bluegill	5	6	1.2	3.0- 4.9	1	T		None		1.4
Spotted sunfish	5	1	0.2	3.0- 4.9						0.2
Warmouth	5	2	0.7	3.0- 4.9						0.8
Total		9	2.1		1	T				2.4
NON-PREDATORY FOOD FISH										
Carp	14	3	5.8	7.0-13.9	21	17.7		None		27.4
Drum	10	1	2.3	5.0- 9.9	2	0.5				3.3
Bigmouth buffalo	16			5.0-15.9	1	0.2				0.2
Yellow bullhead	7	2	1.3							1.5
Black bullhead	7	1	1.0							1.2
Total		7	10.4		24	18.4				33.6
PREDATORY FOOD FISH										
Channel catfish	10	14	11.3	5.0- 9.9	10	2.1		None		15.6
Spotted gar				7.0-23.9	12	9.5				11.1
Bowfin	14	2	9.8	5.0-13.9	2	2.0				13.7
Total		16	21.1		24	13.6				40.4
FORAGE FISH										
Gizzard shad	8	75	18.5					None		21.5
Total		75	18.5							21.5
GRAND TOTAL		112	53.5		52	32.4				100.0

Standing Crop = 86 pounds per acre

a/ Johnson Bayou at Junction of Clay Bayou.

November 1975

LIST OF FISH SPECIES OCCURRING IN JOHNSON BAYOU WATERSHED a/

Bigmouth buffalo	*Ictiobus cyprinellus*
Black buffalo	*Ictiobus niger*
Black bullhead	*Ictalurus melas*
Black crappie	*Pomoxis nigromaculatus*
Blue catfish	*Ictalurus furcatus*
Bluegill	*Lepomis macrochirus*
Bowfin	*Amia calva*
Carp	*Cyprinus carpio*
Channel catfish	*Ictalurus punctatus*
Freshwater drum	*Aplodinotus grunniens*
Gambusia	*Gambusia affinis*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Grass pickerel	*Essox americanus*
Green sunfish	*Lepomis cyanellus*
Lake chubsucker	*Erimyzon sucetta*
Largemouth bass	*Micropterus salmoides*
Longear sunfish	*Lepomis megalotis*
Longnose gar	*Lepisosteus osseus*
Orangespotted sunfish	*Lepomis humilis*
Pirate perch	*Aphredaderus sayanus*
Redear sunfish	*Lepomis microlophus*
Sailfin molly	*Poecilia latipinna*
Shiner	*Notropis sp.*
Shortnose gar	*Lepisosteus asseus*
Smallmouth buffalo	*Ictiobus bubalus*
Spotted gar	*Lepisosteus oculatur*
Spotted sunfish	*Lepomis punctatus*
Striped mullet	*Mugil cephalus*
Threadfin shad	*Dorosoma petenense*
Warmouth	*Lepomis gulosus*
White crappie	*Pomoxis annularis*
Yellow bass	*Morone mississippiensis*
Yellow bullhead	*Ictalurus natalis*

a/ Unpublished sampling data. Louisiana Wild Life and Fisheries Commission.

WATER QUALITY DATA

Johnson Bayou Watershed

Parameters	Date	Johnson Bayou	Borrow a/ Pits	Fisher Bayou
Color (units)	2-19-75	55	25	110
	3-24-75	40	40	120
	4-22-75	45	35	60
	5-14-75	80	62	60
	6-12-75	65	60	30
	6-25-75	18	30	42
	8-26-75	35	20	60
	9-29-75	b/	b/	b/
	12-2-75	30	42	22
	1-7-76	20	55	40
	2-3-76	50	20	60
Hardness (ppm) (CaCO3)	2-19-75	108	190	60
	3-24-75	152	136	72
	4-22-75	135	160	72
	5-14-75	96	98	74
	6-12-75	108	95	60
	6-25-75	70	160	68
	8-26-75	100	110	42
	9-29-75	152	170	80
	12-2-75	160	188	162
	1-7-76	215	205	105
	2-3-76	120	114	108
Nitrogen (ppm) Ammonia (N)	2-19-75	.32	.10	.20
	3-24-75	.50	.50	.60
	4-22-75	.40	.35	.42
	5-14-75	.78	.25	.38
	6-12-75	.75	.52	.75
	6-25-75	.50	.40	.71
	8-26-75	.67	.40	.55
	9-29-75	.60	.50	.95
	12-2-75	.60	.75	.78
	1-7-76	.33	.48	.50
	2-3-76	.75	.65	.73
Nitrogen (ppm) Nitrate (N)	2-19-75	.90	.50	.50
	3-24-75	.20	.10	.10
	4-22-75	.30	.20	.30
	5-14-75	.20	.05	.15
	6-12-75	.20	.15	.20
	6-25-75	.30	.10	.35
	8-26-75	.15	.10	.10
	9-29-75	.05	.05	.05
	12-2-75	1.10	.65	.15
	1-7-76	.10	.15	.10
	2-3-76	.80	2.00	.05
Oxygen (ppm)	2-19-75	7.0	7.0	3.0
	3-24-75	6.0	7.0	3.0
	4-22-75	7.0	7.0	3.0
	5-14-75	4.0	8.0	5.0
	6-12-75	5.0	5.0	3.0
	6-25-75	7.0	7.0	2.0
	8-26-75	7.0	6.0	2.0
	9-29-75	8.0	9.0	3.0
	12-2-75	10.0	9.0	4.0
	1-7-76	12.0	10.0	3.0
	2-3-76	10.0	9.0	4.0
pH (units)	2-19-75	7.5	8.5	6.5
	3-24-75	7.5	8.0	6.5
	4-22-75	7.5	7.7	6.5
	5-14-75	7.0	7.5	6.5
	6-12-75	7.0	7.0	6.5
	6-25-75	6.8	7.7	6.3
	8-26-75	7.7	7.7	6.3
	9-29-75	8.0	8.5	6.7
	12-2-75	8.5	8.5	6.8
	1-7-76	8.0	8.0	6.8
	2-3-76	7.8	7.5	6.8
Phosphate (ppm) Ortho (PO_4)	2-19-75	.45	.45	.80
	3-24-75	1.10	1.10	1.30
	4-22-75	.40	.33	.30
	5-14-75	.70	.63	.30
	6-12-75	.72	.63	.37
	6-25-75	.30	.36	.33
	8-26-75	.40	.25	.32
	9-29-75	.40	.17	.80
	12-2-75	.50	.32	.35
	1-7-76	.20	.25	.16
	2-3-76	.32	.60	.22
Sulphate (ppm) (SO_4)	2-19-75	15	20	0
	3-24-75	18	17	0
	4-22-75	17	22	0
	5-14-75	0	0	0
	6-12-75	16	5	0
	6-25-75	15	17	0
	8-26-75	13	12	7
	9-29-75	17	15	0
	12-2-75	38	34	13
	1-7-76	34	36	11
	2-3-76	30	23	5
Sulfide (ppm) (S)	2-19-75	Tr.	0	.05
	3-24-75	.04	.03	.02
	4-22-75	.03	.01	.04
	Discontinued			
Suspended (ppm) Solids	2-19-75	100	15	7
	3-24-75	25	10	18
	4-22-75	80	15	2
	5-14-75	22	25	25
	6-12-75	35	42	115
	6-25-75	510	16	8
	8-26-75	70	18	5
	9-29-75	40	38	5
	12-2-75	40	35	10
	1-7-76	15	10	5
	2-3-76	50	85	5
Temperature (°F)	2-19-75	60	62	55
	3-24-75	65	65	63
	4-22-75	65	72	66
	5-14-75	78	80	74
	6-12-75	86	80	80
	6-25-75	87	82	81
	Discontinued			
Turbidity (FTU)	2-19-75	180	55	45
	3-24-75	80	55	70
	4-22-75	130	45	50
	5-14-75	70	65	75
	6-12-75	105	135	255
	6-25-75	550	39	52
	8-26-75	115	45	65
	9-29-75	80	90	55
	12-2-75	98	75	60
	1-7-76	45	48	42
	2-3-76	140	200	75

a/ Morganza Floodway West Guide Levee Borrow Pits.
b/ Data not available.

PESTICIDE RESIDUE CONCENTRATIONS[a/]
Johnson Bayou Watershed[b/]

	Mirex (ppm)	P,P'DDE (ppm)	P,P'DDD (ppm)	P,P'DDT (ppm)	Toxaphene (ppm)	Dieldren (ppm)
Yellow Bullhead[3/] 9-14-72	.01	1.20	.95	.16	--	--
Bluegill[6/] 9-14-72	none	.14	.01	--	<.3	--
Blue catfish & Yellow bullhead[5/] 9-14-72	.01	.11	.02	--	--	--
Yellow bullhead[4/] 9-14-72	none	.12	.17	--	.9	--
Mussel[5/] 9-14-72	No ClHc detected at .01 ppm					
Crawfish[2/] 9-20-73	c/	--	--	--	--	--
Gizzard shad[3/] 9-20-73	c/	.30	.41	--	2.1	--
White crappie[5/] 9-20-73	c/	--	--	--	12.7	Tr.
Crawfish[5/] 9-20-73	c/	--	--	--	--	--
Mussel[5/] 9-20-73	c/	--	--	--	.9	--
Green sunfish[b/] 9-20-73	.01	.03	.04	--	--	--

Station 3/ Bayou Latenache (lower)
Station 4/ Coyles Bayou at Hwy. 417 crossing
Station 5/ The Bays at Hwy. 417 crossing
Station 6/ Bayou Latenache at Innis

a/ Each line item represents one composite sample.
b/ Source: Louisiana Wild Life and Fisheries Commission
c/ Not detected at .02 ppm.

Pesticide Residue Concentrations a/

Johnson Bayou Watershed b/

	P,P' DDE (ppm)	P,P' DDD (ppm)	P,P' DDT (ppm)	Toxaphene (ppm)
Largemouth bass 3-18-76	.13	.04	.04	.44
Spotted gar 3-18-76	1.80	.90		5.40
White crappie 3-18-76	.40	.14		.94
Gizzard shad 3-18-76	.18	.08		.61
Black crappie 3-18-76	.07	.04		.41
Freshwater drum	.15	.04		.79

a/ Each line item represents one composite sample.

b/ Borrow pits of the Morganza Floodway West Guide Levee near the Pointe Coupee drainage structure.

CURRENT ESTIMATED POPULATIONS OF GAME SPECIES
Johnson Bayou Watershed[a/]

Species	Habitat Type	Acres	Number Per Acre(s)	Total In Watershed
Dove	Open Land	51,500	1/3	17,165
Quail	Open Land	51,500	1/20	2,575
Woodcock	Open Land & Forest Land	74,300	1/10	7,430
Squirrel	Forest Land	22,800	1/2	11,400
Deer	Forest Land	22,800	1/20	1,140
Rabbit	Open Land & Forest Land	74,300	1/10	7,430
Waterfowl (Resident)	Water Areas, Forest Land & Open Land	74,600	1/150	495
Waterfowl (Migratory)	Water Areas, Forest Land & Open Land	74,600	1/15	4,975
Wild Turkey	Forest Land	22,800	1/200	115
Black Bear[b/]	Forest Land	22,800		

a/ Data developed in cooperation with Louisiana Wild Life and Fisheries Commission.

b/ Population data not available.

Other common mammals, birds, repitles, and amphibians present are as follows:

1. Mammals - opossum, bobcat, striped skunk, armadillo, coyote, gray fox, cotton rat, red bat, southeastern myotis, Southern flying squirrel, marsh rice rat, whitefooted mouse, Eastern wood rat, and least shrew.

2. Birds - Eastern bluebird, Eastern meadowlark, common crow, blue jay, mockingbird, pileated woodpecker, red-headed woodpecker, downy woodpecker, barred owl, screech owl, cattle egret, great egret, snowy egret, Louisiana heron, great blue heron, little blue heron, yellow-crowned night heron, blue-winged teal, gadwall, hooded merganser, red-shouldered hawk, red-tailed hawk, house sparrow, brown thrasher, and belted kingfisher.

3. Reptiles - five-lined skink, ground skink, green anole, Southern fence lizard, Eastern garter snake, Southern copperhead, Western cottonmouth, broad-banded water snake, diamond-back water snake, gray rat snake, smooth softshell turtle, stinkpot turtle, common snapping turtle, and red-eared turtle.

4. Amphibians - dwarf salamander, small mouthed salamander, marbled salamander, three-toed amphiuma, Fowler's toad, gray tree frog, green tree frog, spring peeper, Southern cricket frog, Southern leopard frog, bullfrog, lesser Western siren, Central newt, Eastern narrow-mouthed toad, upland chorus frog, and bronze frog.

Water areas listed previously are utilized by resident and migratory waterfowl. About 9,295 acres of wetlands also furnish habitat for waterfowl. Wetland types and acreages are listed on page 11. Existing wetlands form the nucleus of the waterfowl habitat. Wetlands serve as brood habitat for wood ducks and hooded mergansers. Many species of waterfowl use wetlands for feeding, resting, and roosting. To illustrate the value of wetlands to other wildlife, 20 species of game and fur animals utilize Type 1 wetlands in Louisiana. Additionally, many species of nongame mammals, birds, reptiles, and amphibians utilize wetlands as part of their habitat. Wetlands are unique ecosystems serving many valuable functions.

The American alligator, an "endangered" species listed on the Department of the Interior's list of rare and endangered species, is present.14/ In September, 1975 the Department of the Interior

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14/ U.S. Department of the Interior, Fish and Wildlife Service. "Threatened Wildlife of the United States," 1973 edition. Resource Publication 114, March 1973 (Revised Resource Publication 34).

reclassified the American alligator as a "threatened" species in Cameron, Calcasieu and Vermilion Parishes, due to their similarity in appearance to the endangered alligators. Use of this provision enables the Federal government to assist the states in controlling commerce in such products. The American alligator is still on the "endangered" species list throughout the remainder of its range. The Southern bald eagle, another "endangered" species, may be an infrequent visitor in the project area. Habitat conditions utilized by Bachman's Warbler are available but no sightings have been reported. Although the black bear is not on the list of "endangered" species, it is uncommon in Louisiana. The highest population in the State occurs in the vicinity of the project. The Louisiana Wild Life and Fisheries Commission opened portions of Pointe Coupee Parish for bear hunting in December 1974.

Agricultural fields consisting of cropland and pastureland comprise 51,500 acres. Major crops in the cropland consist of soybeans and cotton. Vegetation of the pastureland includes bahiagrass, Common bermudagrass, fescue, dallisgrass, clover, and small grains such as oats, winter wheat, and ryegrass. Fallow fields contain a diversity of vegetation. Plants present depend upon the successional stage. Common species in the fallow fields include panic grasses, various andropogens, paspalums, dock, sesbania, goldenrod, doveweed, common ragweed, Johnsongrass, Yankeeweed, and aster.

The forested vegetative plant community consists of mixed species of bottom land hardwoods. This plant community totals 22,800 acres. Tree species in the overstory include sweetgum, water oak, willow oak, live oak, hackberry, green ash, baldcypress, water locust, tupelogum, boxelder, bitter pecan, sweet pecan, willow, sycamore, and American elm. Understory vegetation consists of hawthorne, deciduous holly, swamp privet, buttonbush, switchcane, Japanese honeysuckle, blackberry, trumpetcreeper, greenbrier, rattan, devils-walkingstick, roughleaf dogwood, American beautyberry, and reproduction from overstory species.

The present hydrologic condition of the forest soils is very poor. Even under intensive management, the relative hydrologic conditions of the forest soils will improve very little. Although these areas are adequately stocked with fair humus building species, and every effort to improve the species composition will be made, the humus buildup will be slow, largely due to the inherently poor development capabilities of the heavy forest soils in the watershed.

Aquatic vegetation found along and in the ponds, levee borrow pits, and other wetland areas includes water hyacinth, alligator weed, pondweed, duckweed, giant cutgrass, cattail, coontail, arrowhead, sedges, rushes, and various algal species.

Recreation Resources

A 1974 inventory conducted by the Louisiana State Parks and Recreation Commission listed 41 recreational sites for Pointe Coupee Parish.

About 137,100 acres are in 13 organized hunting clubs. The remaining recreation areas in the parish consist of 15 privately owned, water-dependent developments which are open to the public on a fee basis and provide facilities primarily for sport fishing. Some of these areas also provide small picnic areas, camping areas, cabins, boat liveries, small beaches, water skiing, and boating; one gun club; one publicly owned boat launch ramp; one rodeo arena; three small community parks; one church-owned recreation area; one country club and golf course; one yacht club; four historical areas or sites; and one private recreation area open only to members and guests.

Two of the four historical sites, an old home and a church, are located in the watershed.

The main water-dependent recreational activities within the study area are bank fishing, float fishing, crawfishing, frogging, boating, waterfowl hunting, and swimming.

The major water bodies which provide recreational opportunities within a 30-mile radius of the watershed are the Atchafalaya River Complex, Bayou Maringouin, Bayou Teche, Bayou Courtableau, Bayou Wauksha, Raccourci-Old River, False River, Bayou Cocodrie, Bayou Sara, Spring Bayou, Black River, Red River, Lake Pearl, and Lake Mary. Within the watershed the lower reaches of Johnson Bayou and the borrow pits along the levee in the southern portion of the watershed are the chief fishing waters. Most of the open water areas are fished by sportsmen. Recreational use of these areas could be increased substantially by additional boat ramps and improved access roads.

Public use of channels, bayous, and canals is high where access exists. Recreation facilities use is high. The 22,800 acres of hardwood bottom lands has a potential for hunting and other recreational uses, but 95 percent is posted against public use.

Archaeological, Historical, and Unique Scenic Resources

The Curator of Anthropology and the Louisiana Historic Preservation Officer have been contacted concerning known archaeological and historical sites within the watershed. The National Register of Historic Places was also reviewed. Two known archeological and two historical sites are within the watershed. Only one site, Saint Stephens Episcopal Church near Innis, is on the National Register.

The Soil Conservation Service contracted with Louisiana State University to conduct a survey in order to determine the existence of any archaeological or historical sites that would be affected

by installation of structural measures. This survey is complete. No archaeological or historical sites were discovered by this survey that are located within the area to be disturbed by the installation of structural measures.

Soil, Water, and Plant Management Status

Soybeans became a popular crop in the early 1960's. The acreage in Pointe Coupee Parish increased from 220 acres in 1960 to 28,000 acres in 1970. Soybean acreage in the problem areas of this watershed is approximately 28,800 acres. Many acres of cotton, sugarcane, corn, pastureland, and forest land have been replaced by soybeans.

The forest land on the watershed, except for the industrial ownership and management, and a few soil and water conservation district cooperators is in an unmanaged condition. (Except for the timber industry-owned lands, there have been no formal forest management plans written, or applied on the forested areas of the watershed.) Relatively high marketing costs depress stumpage prices. Timber sales provide small supplementary income to private land users.

The watershed is in the Upper Delta Soil and Water Conservation District. Soil and water conservation plans have been prepared for 134 district cooperators on 41,370 acres, or 50 percent of the watershed. An estimated 6 percent of the needed conservation measures has been applied, thus adequately treating 4,560 acres. During the last 10 years, land users have applied conservation measures costing approximately $219,400 (see table 1A) on water problem areas as well as nonproblem areas.

The Soil Conservation Service personnel work closely with the soil and water conservation district in establishing priorities of work to be done in promoting conservation. The districts announce important activities through newsletters, radio, television, and newspapers. The district employs a clerk-typist to assist Soil Conservation Service field office personnel. The district is actively involved in broad resource planning and cooperates with various planning bodies.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Treatment

The soils in the watershed have low erosion rates, but when left unprotected during periods of high rainfall an erosion hazard does exist. The generally flat terrain and high rainfall creates a severe wetness problem on crop and pastureland. As a result, many farmers are reluctant to install the needed land treatment measures.

For example, in order to plant at opportune times, many farmers plow under the crop residues of the previous crops immediately after harvest. This allows him to plant a little earlier in the spring, but it also robs the soil of the much needed cover during the months when rainfall is generally high.

Once adequate drainage outlets are provided, proper onfarm drainage systems are more apt to be installed. As a result, other land treatment measures that reduce sediment and erosion and insure yields will be installed.

Although water does come onto and runs off from the forested areas of the watershed, there is little evidence that it creates a problem for the timber stands themselves. The existing forest cover types actually require annual fluctuation of water levels to maintain a soil moisture that favors the better forest trees and produces maximum growth.

Floodwater Damages and Drainage Problems

Floodwater and drainage problems are inseparable in the agricultural areas. Flooding from storm runoff aggravates and prolongs wet soil conditions in the nearly level terrain. Drainage is defined as the removal of excess subsurface or surface water from high water tables or normal precipitation. Flood prevention is defined as the conveyance, control, and disposal of surface water caused by abnormally high direct precipitation or stream overflow. Because of the flatness of the terrain, the wetness of the soil, and high annual rainfall, water problems are closely interrelated. For instance, an abnormally high rain may occur which saturates the soil. Before soil moisture conditions are reduced sufficiently to allow the soil to be worked, a normal rainfall occurs which again saturates the soil and prolongs the excess moisture problem. Channels in the problem areas are not adequate to prevent frequent, direct damages from flooding or to allow onfarm drainage systems to function properly.

This watershed, served by an estimated 128 miles of channels, has been identified by the Sponsors as having inadequate drainage and flood problems. These channels are classified according to the type of channel and flow conditions, and tabulated as follows:

Type of Channel	Miles
Well-defined natural channel	19
Previously-modified or manmade channel	109
Total	128

Flow Characteristics	Miles
Ephemeral	93
Intermittent	20
Ponded Water	15
Total	128

The average annual rainfall is 55 inches. Rainfall of at least 4.2 inches in 48 hours occurs at an average rate of twice a year, 5 inches once a year, and 6.7 inches once in 3 years.

Average annual agricultural damages caused by floods with average recurrence intervals of not more than 3 years are greater than from larger, less frequent floods. Damaging out-of-bank flows occur in portions of the area at an average rate of twice a year.

The majority of the cultivated land has been in crops for many years; however, some recent clearing has occurred. Normal deterioration of channels and increased runoff caused by land use changes have rendered drainage systems inadequate.

Excess water causes delays and difficulties in planting, cultivating, and harvesting that require additonal use of equipment and labor. The delays also reduce crop yields and quality.

The estimated average annual "present" yields per acre are 26.8 bushels of soybeans, 493 pounds of lint cotton, 43.1 bushels of corn, 25 hundred weights of grain sorghum, and 23.5 bushels of wheat. Pasture yields range from 60 pounds of beef per acre on low management pasture to 177 pounds of beef per acre on high management pasture and average 84 pounds. In addition, yield on supplemental ryegrass is 180 pounds of beef per acre.

Soybean lands best illustrate the severity of the flooding and wetness problems since they represent the largest acreages and the soybean crops suffer the most damages. Rainfall is highest

in winter and spring and lowest in the late summer and early fall. Relatively little land preparation can be accomplished in early spring because large portions of the land are wet. When the better-drained portions of some fields are ready to plow, the poorly-drained portions are too wet. Work can be done on only the dry portions, but often this is not economical. If the wet portions are plowed, soils may clod or the machinery might stall in the mud, which causes extra expenditures of time and money and excessive wear and tear on the machinery. If the entire field is plowed with some portions wet, reworking is usually necessary to put the field in good tilth.

If adequate plant populations are established in early spring, water damage to the crop from late spring rains may occur, causing replanting or loss of the crop. Consequently, much planting is delayed until late June or early July. Since June is a dry month, a good plant population is difficult to establish because a dry soil hinders seed germination.

The root systems of soybeans planted late in the season are not developed as extensively as that of those planted early. Therefore, their growth is limited more by moisture deficiencies during the dry months of August, September, and October. Usually, late soybeans are not ready for harvest until November or December. The sum of the average rainfall for November and December exceeds that for September and October. (September and October would be the normal harvest season for early soybeans.) Thus, much of the late soybean harvest is delayed or performed under highly unfavorable conditions.

When wetness causes delays in harvesting, soybeans often mildew in the pod and retain more moisture than is desirable. The longer harvest is delayed, the greater the loss from pods shattering. When the ground is wet, the cutter bar of the harvester cannot be maintained at the proper level because the machine sinks and bogs. Consequently, soybeans that would have been harvested are lost in the field. When this condition exists on wet soils, harvested beans have to be hauled to the truck from the field by tractor and grain cart because the combine cannot empty directly into the truck. Overall, harvesting under adverse wet conditions is more costly and more time consuming.

A research report entitled The Effects of Production Practices on Soybean Yields, Costs and Returns in the Mississippi River Delta of Louisiana, published by the Department of Agriculture Economics and Agribusiness of Louisiana State University describes the problem in more quantified terms. One of the key points made in this study is that there seemed to be a direct relationship between yields per acre and planting dates, soil types, surface and subsurface drainage, and land forming. Low-yield producers

had less favorable soil types, poor drainage, and fewer land forming practices, and they planted a greater percentage of soybeans at a later date than did high-yield producers. The following tabulation is a summary of production practices considered in the study:

A Percentage Comparison of Production Practices for Soybeans by Yield Groups, Mississippi River Delta Area, Louisiana, 1970

Item	Unit	Yield Group		
		Low	Medium	High
Average number of acres planted	acres	597.4	815.4	636.6
Heavy soil type	percent	78.1	70.2	50.5
Very good surface drainage	percent	6.7	9.6	25.7
Very good subsurface drainage	percent	0	4.8	3.7
Land forming practices	percent	7.6	15.4	29.3
Liming	percent	12.4	34.6	22.9
Fall plowing	percent	72.4	73.1	91.8
Deep tillage	percent	48.6	55.8	64.2
Planting on a bed	percent	38.1	51.0	50.5
Planting on 40-inch rows	percent	50.5	37.5	57.8
Completed planting by May 31	percent	59.4	86.5	85.3
Double-disc opener planter	percent	51.4	38.5	46.8
Sword-type planter	percent	48.6	61.5	53.2
Use of pre-emergence herbicides	percent	74.3	81.7	80.7
Four cultivations	percent	27.6	41.3	31.2
Use of post-emergence herbicides	percent	40.0	43.3	41.3
Hand hoeing	percent	32.4	50.0	57.8
Flame cultivation	percent	3.8	7.7	4.6
Use of lay-by herbicides	percent	10.5	13.5	5.5
Complete weed control program	percent	9.5	17.3	21.1
Fields free of weeds	percent	25.7	37.5	59.6
Use of insecticides	percent	33.3	39.4	22.0
Average or better weather condition	percent	10.5	37.2	53.2

Several important implications from the summary of the study are as follows:

(1) The number of acres of soybeans produced was not a factor limiting the yield of soybeans for any group;

(2) low-yield producers can increase average yields and returns through increased crop rotation programs, primarily because this helps control weed infestation;

(3) low-yield producers can increase yields and returns through more intensive drainage and land forming practices;

(4) low-yield producers with careful variety selection based on soil type, date of planting, maturity dates, and specific soil physical characteristics can increase yields and incomes;

(5) low-yield producers can generally increase yields by planting approximately 1 bushel of certified, high quality seed per acre before May 31, and that early maturing varieties (Hill, Dare, and Hood) suffer more from later planting dates than medium and late maturing varieties (Davis, Bragg, Lee, and Lee 68);

(6) low-yield producers can increase yields and returns by a more complete weed control program (both chemical and mechanical) where weed and grass infestation is a proglem; and

(7) low-yield producers using four-row equipment can lower costs of production by using six-row equipment if they have at least 600 to 800 acres and if the age of present four-row equipment, timeliness of operation, labor availability, etc., would warrant the change.

Other crops are affected in a similar manner, although not as adversely. Pasture is affected; growth of grasses is slowed and the grass is unpalatable. Water tolerant weeds are difficult to eradicate. Stocking rates are not kept at full potential because grasing days are lost. Extra expenses are incurred in either moving the cattle or hauling hay and feed to them.

Indirect damages associated with flooding include any losses from flooding not directly related to it. Examples are traffic detours and extra expenses incurred as a result of delays in obtaining feed and other farm supplies. Also, market losses to farm products can be attributed to delays in transportation as a result of flooding.

Total average annual inseparable damages attributed to floodwater and impaired drainage amount to $396,600. Of this amount, $198,300 was allocated to drainage, and $198,300 was allocated to flood prevention. In addition, average annual indirect floodwater damages are $9,900.

Water Quality Problems

The surface water quality is acceptable for the current uses being made of the water. These uses include fish production and outdoor recreation in the form of boating.

Ammonia nitrogen levels in the surface water exceeded the 0.2 ppm, which represents concentrations generally found in unpolluted streams, at all stations and sampling periods except the borrow pits and Fisher bayou in February, 1975. Phosphate (ortho) levels were above the 0.01-0.03 ppm range of normal waters at all stations the majority of the time. Fisher Bayou had dissolved oxygen levels below the recommended Louisiana Standard of 5 mg/l for 10 of the 11 sampling periods. The sample station on Fisher Bayou was located about 50 feet downstream from the large, dense, wooded swamp in the northeastern part of the watershed. This wetland complex occurs in a natural sump and Fisher Bayou is the main outlet for it. Water in the wetland complex is not subjected to wave action, which prevents the addition of oxygen from this important source. Water in the wetland complex remains relatively stable for extended periods of time. Large amounts of organic matter, primarily in the form of leaves, are added to the water in this wetland area. The decomposition of this organic matter helps deplete the dissolved oxygen. A combination of these factors results in a low dissolved oxygen value at the sample station on Fisher Bayou.

Erosion Damage

Sheet erosion is the primary type of erosion. There is some streambank erosion but it is minor and not concentrated within any one area. Roadside erosion is almost nonexistent.

Sheet erosion amounts to approximately 196,000 tons per year at the present time. This amounts to approximately 2.4 tons per acre year. While this amount of watershed erosion does not constitute a problem, the sheet erosion from row cropland, at 5.4 tons per acre per year, is above the tolerance level. Since the soils within the watershed are very deep, no monetary damage has been ascribed to the soil loss, but the long-time effect of this amount of erosion will reduce the productivity of the soils.

Sediment Damage

Sediment derived from sheet erosion and delivered to the watershed boundary amounts to 82,000 tons per year.

Sediment damage to crops and pasture is in the form of deposition from floodwater on the growing plants. This damage is grouped with other floodwater damages. The nature of the sediment, the fine texture, and the sparsity of concentrations of sediment deposits prohibit the assignation of monetary damages to the land. Decreases in channel capacity due to sediment deposition result in the need for occasional cleanouts.

Recreational Problems

Local interest exists for developing recreational facilities to overcome the need within the watershed and area. Existing recreational facilities within a 30-mile radius of the approximate center of the watershed do not meet the demands of the public. Within the watershed, the main water bodies presently suitable for increased recreational use, chiefly sport fishing, are the borrow pits located along the levee in the southern portion of the watershed and the lower portion of Johnson Bayou. However, the present recreational use of these and other open water areas in the watershed is limited by lack of adequate access and support facilities.

Boat launch ramps, improved access roads, and support facilities would enhance the recreation opportunities of these areas.

The 1970 population within the before mentioned 30-mile radius of the watershed is about 105,204; 94,684 are 5 years of age and over, the age group defined by the Louisiana Statewide Comprehensive Outdoor Recreation Plan as the recreating public. Projections to the year 2000 indicate the population will be 155,000 representing a 48-percent increase in a 30-year period. The recreational demands based on the present population, 5 years of age and over, are 1,072 tent camping sites, 1,036 trailer camping sites, 1,218 picnicking tables, 3 beaches and associated swimming water areas, and 198 boat launching ramps. Subtracting the present supply from present demands on the 30-mile radius area indicates a remaining need for 882 tent camping sites, 706 trailer camping sites, 901 picnicking tables, 3 beaches and associated swimming water areas, and 156 boat launching ramps.

Fish and Wildlife

Clearing of bottom land hardwoods has been the major factor affecting this plant community and the species of animals associated with this habitat. During the period 1954 to 1974, 15,500 acres of hardwoods were cleared and converted primarily to soybean production. Forest dwelling animals have suffered from this habitat loss and open land species have benefited. The overall net effect on wildlife has been negative.

Water quality in downstream areas has also been affected by converting forest land to open land. This in turn affects the fisheries by favoring commercial species instead of game fish. Nutrients, primarily nitrogen and phosphorus, and pesticides are reaching downstream environs in greater quantity than when the area was forested.

About 95 percent of the 22,800 acres of forest land is posted and not available for public use. Hunting clubs lease these forested

areas for hunting privileges. Consequently, nonmembers have to go to other areas or out of state to have a place for this activity. Hunting demands from highly populated areas further compound the problem. Seventy percent of the open land is posted.

Access to and through the forested areas is a problem during high rainfall periods. During the wet season, four-wheel drive or all-terrain vehicles are the primary means of transportation in these areas.

Economic and Social

The level of income necessary for surviving on a minimum diet with none of the amenities of prosperity has been determined by the Social Security Administration.1/ An individual is considered poor if his personal income or the income of his family inadequately provides for his subsistence. In 1960, by this definition, 56 percent of all families in Pointe Coupee Parish were classified as poor. In 1966, 45 percent were so classified. This was an improvement of approximately 11 percent since 1960. However, 96 percent of all the counties in the United States still had a smaller proportion of poor families. About 0.5 percent of all the families in Louisiana live in Pointe Coupee Parish. However, 1 percent of all the poor families in the State reside in this parish.

According to the 1970 census for Pointe Coupee Parish, 5,119 families lived in the parish and had a median income of $4,957. Of the total families, 19 percent were urban with a median income of $4,222; 59 percent were rural nonfarm with a median income of $4,442; and 22 percent were rural farm with a median income of $5,627. About 40 percent of the urban families had incomes less than the poverty level, while 40 percent of the rural nonfarm and 28 percent of the rural farm families had incomes less than the poverty level.

Most of the Pointe Coupee Parish's economic conditions are below the Louisiana average. Compared with Louisiana averages, Pointe Coupee Parish has 35 percent more primary individuals who are 65 years of age and over, 114 percent more occupied households which average 1.51 or more persons per room, and 177 percent more occupied households lacking complete plumbing facilities.2/

1/ James R. Bobo and Dean A. Dudley, Statistical Abstract of Louisiana, 4th ed. (New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971), p. 170.

2/ Fred M. Wrighton and Barbara H. Denton, "Population and Housing Correlates of Poverty in Louisiana, 1970" The Louisiana Economy (Ruston: College of Business Administration, Division of Business and Economic Research, Louisiana Tech University, 1971), Vol. No. 2 (May 1972), pp. 2-5.

Old age assistance and aid to dependent children are the two largest recipient groups of welfare aid in Pointe Coupee Parish. Of the total public welfare assistance grants made in fiscal year 1968-69 in the parish, 59 percent was for old age assistance, 30 percent was for aid to dependent children, 8 percent was for disability assistance, 2 percent was for general assistance, and 1 percent was for aid to the needy blind. About 40 percent of the parish population was under 18 years old and 10 percent was 65 years old and over.3/ Information from the 1970 census reveals that 8 percent of the people over 25 years old had never completed 1 year of school and 26 percent were high school graduates. The median for years of school completed was 6.2. The preceding statistics for the parish are considered to be representative of the watershed.

A trend of increasing farm sizes and decreasing number is continuing in the watershed. According to 1969 Census of Agriculture data, Pointe Coupee Parish had 811 farms, or 28 percent less than in 1964. The average farm size in the parish increased from 212 acres in 1964 to 282 acres in 1969. Increased production costs and relatively static prices for farm products until 1973 have caused decreased net returns per acre. Small operators have either been forced to quit farming, expand their acreages, or supplement their incomes with other work. Many of the small farmers have either sold or rented their land. The majority of the remaining small farmers are employed off the farm and are not primarily dependent on the farm for their livelihood. According to the 1969 census of Agriculture data for the parish, about 52 percent of the farms had sales of less than $2,500, 69 percent had sales of less than $5,000, and 81 percent had sales of less than $10,000.

The trend of decreasing number of farms and increasing size is expected to continue in the future. Farmers are trying to raise their income by farming more land. This land comes primarily from small uneconomic farm units that are acquired by large, more profitable farmers. In order to accomplish this, they have to use large, more expensive labor-saving equipment.

The population of Pointe Coupee Parish decreased by 486 from 1960 to 1970. The net out-migration was 3,767. This was a 15-percent decrease in the expected 1970 population. The expected 1970 population was calculated by adding births from 1960 to 1970 to 1960 population and subtracting deaths which occurred during the same time.4/

3/ Bobo, op cit., p. 80

4/ Roger L. Buford and Sylvia G. Murzyn, Population Projections by Age, Race, and Sex for Louisiana and Its Parishes 1970-1985, Occasional Paper No. 10 (Baton Rouge: Division of Research, College of Business Administration, Louisiana State University, 1972).

Many of the young adults are leaving the farm to seek employment elsewhere. Increased efficiency of ramaining labor through greater mechanization is necessary for survival of the family-type farm.

PROJECTS OF OTHER AGENCIES

Mississippi River Levees (Main Line) - After the disastrous flood of 1927, Congress adopted a comprehensive plan for flood control in the Mississippi Rive Alluvial Valley. There are 1,597 miles of levees and floodwalls now authorized along the Mississippi River below Cape Girardeau (Missouri). A part of the levee line on the west bank forms the east boundary of this watershed. Another portion of this project, the levee protecting land from flooding by the Atchafalaya River and Old River, forms the northern and western boundaries of the watershed.

East Atchafalaya Basin Floodway (Morganza Floodway) - This is a completed flood control feature of the "Flood Control, Mississippi River and Tributaries" project.

Located on the west side of the Mississippi River, the Morganza Floodway is one of two artificial diversions to the Atchafalaya Basin Floodway. It serves to divert from the Mississippi River to the Atchafalaya Basin Floodway all flows above the quantity that can be safely passed by the leveed channel of the Mississippi River below.1/

The floodway consists of a combined gated control structure, high-level highway, and railroad crossings over the floodway; guide levees to confine the diverted floodwaters; and drainage alterations and modifications. The west guide levee forms the southern boundary of this watershed.

The levee forming the upper west limit of the floodway is the southern boundary of the watershed. The borrow pit created by the excavation of fill material used to construct this levee serves as the main drainageway for Evaluation Unit 1 (see Project Map, Figure 6). The series of levees described above comprises what is commonly referred to as the Upper Pointe Coupee Loop.

The Upper Pointe Coupee drainage structure, located through the levee at Bayou Latenache, is the outlet for the watershed.

Upper Pointe Coupee Loop Area - This project has been re-studied by the U.S. Corps of Engineers to determine the extent of improvements needed to provide adequate drainage for the area.

1/ Excerpts from "Water Resources Development in Louisiana" by U.S. Army Corps of Engineers, 1969.

Their report concluded that the most practical and economical plan to provide additional flood control and drainage is to install a series of pumps and associated channels. Plans and designs are now being prepared to install this pumping plant as a companion project to the Johnson Bayou Watershed Public Law 566 project. The pumps are designed to operate during periods of high water that would reduce or preclude the use of gravity discharge through the structures at Bayou Latenache. Both the Corps and watershed projects are interdependent and must act as companions to each other for the mutual benefits to be realized.

Since 1945, the Louisiana Department of Public Works, cooperating with the local organizations, installed a system of channels. Due to subsequent changes in land use and normal deterioration of the channels, most of these are no longer adequate to provide the needed protection.

PROJECT FORMULATION

On February 10, 1956, the Upper Delta Soil and Water Conservation District Supervisors met to discuss the need for improved drainage and flood prevention in the Johnson Bayou Watershed. As a result of this meeting, they drafted a watershed application and submitted it to the Louisiana Soil and Water Conservation Committee on February 13, 1956. The application was approved by this committee on April 9, 1956.

During the month of May 1956, the project was endorsed by the Pointe Coupee Parish Police Jury, Farm Bureau, School Board, the New Roads Lions Club, and the Board of Commissioners-Atchafalaya Basin Levee District.

Authorization to provide planning assistance under provisions of Public Law 566 was requested May 1, 1956. Planning was authorized May 14, 1956.

Following a field examination in May 1956, planning was initiated.

During the planning process, it was determined that Bayou Latenache, downstream from the Pointe Coupee Drainage Structure, was of inadequate capacity to discharge design flood flows. An alternate plan, the use of a pump as an outlet, was investigated. A consultant engineering firm engaged by the Soil Conservation Service prepared preliminary designs and a cost estimate of the pumping plant.

A preliminary report showed that the costs, including the pumping plant and other project measures needed, would exceed the benefits to be derived. Therefore, planning on the project was terminated.

On May 13, 1967, the Upper Delta Soil and Water Conservation District voted to reactivate the application for planning assistance. On July 8, 1968, the U.S. Army Corps of Engineers (New Orleans District) initiated an evaluation of the flood control and drainage problems within the upper Pointe Coupee Loop Levee Area (Johnson Bayou Watershed.)

On May 13, 1969, the Pointe Coupee Parish Police Jury became a sponsor of the watershed project. On July 15, 1970, the Sponsors made a formal request that the application be reactivated. Authorization to resume planning was issued on August 13, 1970. The Soil Conservation Service informed 39 agencies, organizations, or individuals that authorization to resume planning had been received.

An updated preliminary investigation was made which indicated a favorable benefit-cost ratio could now be expected. The favorable benefit-cost ratio was caused by an increase in cropland acreage and more intensive land use. This change was accelerated by a high price for soybeans and a relatively stable cost of production during the late 1960s.

The Sponsors held a public meeting at Innis, Louisiana on December 3, 1970 with 33 people attending. Federal agencies represented were the U.S. Army Corps of Engineers and the Soil Conservation Service. State agencies represented were the Department of Highways, Public Works, and the Wild Life and Fisheries Commission. One State senator, two State representatives, the president of the Atchafalaya Levee Board, Sponsors, and individuals were present. Preliminary plans were presented by the U.S. Army Corps of Engineers and the Soil Conservation Service. Open expression of ideas and comments were invited from those present. Several individuals or agencies commented on the plans during this hearing.

One specific suggestion was made relative to fish and wildlife. In the northeastern part of the watershed there is a large ridge and slough area. Several residents suggested that consideration be given to constructing a series of levees and water control structures to enhance this area for waterfowl.

On February 4, 1975 biologists of the Soil Conservation Service, Fish and Wildlife Service, and Louisiana Wild Life and Fisheries Commission made a joint reconnaissance of the entire watershed. Special emphasis was placed on evaluation of the suggested waterfowl development area. The consensus reached was that although such a system could be developed to enhance the area for waterfowl, it could not be made a high producing waterfowl area. Also, the area is now producing some waterfowl habitat; in addition, it is producing important mast trees and plant foods utilized by existing wildlife. Additional flooding produced by the proposed levees and structures for water control would cause deer, rabbit, and squirrel, now occupying the area, to leave, yet would not greatly enhance it for waterfowl.

An agreement was reached by participating agencies and the Sponsors concerning this area. Although there are substantial acreages of open cropland in this area that will not be directly benefited by the project, it was decided not to do channel work that would affect this area.

The U.S. Army Corps of Engineers held a public meeting at Innis, Louisiana on July 13, 1972. One hundred thirty people were in attendance. During the public meeting, reference was

made to a previous public meeting held by the Mississippi River Commission on October 21, 1967 when local representatives had requested that consideration be given to modification of the drainage facilities in the Upper Pointe Coupee Loop Area (Johnson Bayou Watershed). The U.S. Army Corps of Engineers reported their study of the area has indicated that an improved drainage system for the area must include both an interior drainage system of the type normally provided under Public Law 566 and improvements of the major outlet, Bayou Latenache, by the Corps.

Plan proposals were presented by the Soil Conservation Service and the Corps of Engineers. The following commented and endorsed the proposed project:

Louisiana Department of Public Works
Atchafalaya Basin Levee District
Bank of New Roads
Monterey Pipeline Co. (conditional endorsement if cost of pipeline relocation paid)
Guaranty Bank and Trust Company
Frank Merric, local farm leader
Lottie Wildlife Protective Association
Police Jury of Pointe Coupee Parish
R. E. Callicott, farmer
John W. Barton, farmer
The Buckhorn Hunting Club
Assessor of the Parish of Pointe Coupee
Sterling Deville, County Agent
John R. Lambert, Jr., cattleman
Raccourci Hunting Club
Pointe Coupee Farmers Elevator, Inc.
Pointe Coupee Farmers Co-op
Jules Cazayoux, Jr.
Pointe Coupee Parish Farm Bureau, Inc. (95 percent of farmers in the parish are members)
Gilmer LaCour, loan company representative

The following commented and expressed various views of adverse environmental effects which would be caused by the project or they made recommendations on measures to take to prevent or reduce adverse environmental effects:

Louisiana Wildlife Federation
Henry K. Miller, M.D. for the Estate of Ovide B. LaCour
National Park Service, U.S. Department of the Interior
National Wildlife Federation
Fish and Wildlife Service, U.S. Department of the Interior
Iberville Parish Police Jury
Roy O. Martin, Timber Company
Louisiana Wild Life and Fisheries Commission

The following opposed the project and stated their reasons:

Orleans Audubon Society

On January 4, 1973 the U.S. Fish and Wildlife Service submitted a report concerning anticipated effects on fish and wildlife by the Soil Conservation Service and the U.S. Army Corps of Engineers projects. Their report also recommends that further action on this project be postponed until completion of the Atchafalaya Basin Ecological Study. The Louisiana Wild Life and Fisheries Commission concurred in the above mentioned report with minor changes recommended. All recommendations made by these agencies to lessen adverse effects of the proposed project were considered and those that could be emplemented in harmony with the project objective have been included in the plan. For further discussion of these recommendations, see the 2nd paragraph under Fish & Wildlife Investigations, page 104.

The Louisiana Historical Preservation and Cultural Commission and the Curator of Anthropology at Louisiana State University were contacted to obtain the locations of places of historical or archaeological importance. The Forest Service assisted in the survey of forest land needs and in watershed plan formulation.

The Sponsors of the Public Law 566 watershed project held a public meeting on May 21, 1975 in the conference room of the Pointe Coupee Parish Library in New Roads, Louisiana. The Soil Conservation Service reviewed the history of flooding and inadequate drainage in the watershed and the steps the Sponsors had made to review planning assistance under Public Law 566. Planning had progressed to the point where alternatives were being developed. These alternatives were presented. An opportunity was provided for public expression of additional alternatives and ideas to be studied. Information that would assist in assessing economic, social, and environmental impacts was requested.

A public meeting was held on February 11, 1976 at New Roads, Louisiana with joint participation by the U.S. Corps of Engineers, the Upper Delta Soil and Water Conservation District, the Pointe Coupee Parish Police Jury, and the Soil Conservation Service. Tentative plans selected by the Corps of Engineers and Soil Conservation Service for providing additional drainage facilities were presented, and the joint draft environmental impact statement on these plans was discussed. The notice of availability of the draft environmental statement was published in the Federal Register on February 27, 1976. A news release was issued by the Office of the New Orleans District Engineer, via local newspapers, and single copies of the draft statement were made available to the public upon request. The U.S. Army Corps of Engineers at this meeting presented their pumping station plan and the Soil Conservation Service presented their Public Law 566 Johnson Bayou Watershed plan.

Objectives

Cropland and pastureland in the watershed are farmed intensively. Landowners and operators are concerned about damages in important agricultural areas as a result of flooding and inadequate drainage. The Sponsors' watershed application and interest displayed at meetings indicate their desire to improve economic conditions. They requested formulation of a project that would allow increased development of all available soil and water resources.

The Sponsoring Local Organization and the Service agreed to develop a plan with the following objectives:

1. Provide improved farming conditions to increase farm family incomes and improve living conditions.

2. Reduce average soil loss to the minimum consistent with sound conservation farming methods.

3. Provide agricultural land a substantial increase in level of protection from flooding and wetness problems in order to increase economic returns.

4. Facilitate achieving the project objectives by accelerating the going land treatment program so that about 62 percent of the agricultural land will be adequately treated by the end of the project installation period.

5. Expedite the development and application of forest management practices which are directed toward the conservation of natural forest ecosystems.

6. Increase forest production on the existing land base and improve the forest products mix to protect the capital investments of land users and forest industry.

7. Install project measures in a manner which will be least damaging to wildlife habitat. Measures will be installed to minimize losses to fish and wildlife where applicable.

Objectives No. 5 and No. 6 should encourage land user participation in an aggressive multiple-use forest management program which should restore the forest land to some semblance of its potential.

Although the forested area is well-stocked with trees, the bulk of the overstory contains only fair timber-producing and soil-protecting species. The planned forest land treatment will favor those species which are potentially better timber producers and soil protectors, and are also desirable for wildlife habitat.

The 1971 fire loss index is 0.25 percent. The average burn record for 1966 through 1970 was zero. The small watershed protection

goal is 0.20 percent burned. This level of protection should be more than adequate to take care of anticipated hazards or risks.

Environmental Considerations

Effects of the structural measures on fish and wildlife habitat were considered. To discourage clearing, channels were designed in such a way that forest land is provided a lesser degree of protection than open land. The design procedure is explained in the Hydraulic and Hydrologic Investigations section. The effects of three different levels of protection were evaluated to determine the optimum balance between drainage and flood prevention measures and the environment.

Design features to minimize adverse impacts on fish and wildlife habitat included:

1. Prepare channel designs in a manner that will insure channel stability even before vegetation is established on the banks.

2. Prepare channel designs that will meet project goals with the least amount of right-of-way clearing in forest land or cause other habitat disturbances.

3. Limit excavation that is required in forest land to the side of the channel with the poorer quality habitat.

4. Avoid excavation in ponded (standing water) channels.

5. Terminate excavation on channels in advance of their confluences with Johnson Bayou, the West Guide Levee Borrow Pit, and the Bays downstream from Fisher Bayou.

6. Seed disturbed areas with plants beneficial to wildlife.

7. Install structures for water control (weirs) to minimize damages to the fisheries in ponded, intermittent, and ephemeral channels.

8. Avoid any channel work or other structural measures that would adversely affect or alter the highly valuable wildlife area located in the northeastern part of the watershed.

The side on which habitat will be preserved was considered in planning and will be determined at the time of construction by the Soil Conservation Service in consultation with the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service.

Erosion and sediment in channels were important considerations and measures were incorporated into the plan to reduce adverse

effects. Short sections of channels will be made deeper at the junctions of principal laterals and main channels for sediment interception.

Vegetation on berms, spoil, and channel side slopes will be established and maintained. Structures for water control will be installed to trap sediment, create 26 miles (99 acres) of additional ponded water in project channels, and reduce soil erosion.

The downstream effects of project measures on peak stages were analyzed. The results of this analysis are shown in EFFECTS OF WORKS OF IMPROVEMENT.

Alternatives

Land Treatment Only - The major land treatment measures that could be installed are conservation cropping system, crop residue management, land smoothing, drainage land grading, drainage mains and laterals, drainage field ditches, pasture and hayland management and planting, improved forest cutting and stand improvement practices, wildlife wetland habitat management, and wildlife upland habitat management. Approximately 23,000 acres not wholly dependent on improved drainage outlets could be adequately treated. The installation cost for this alternative would be $1,747,300.

A plan consisting of "land treatment only" would reduce the erosion ratio for pasture and cropland, but the anticipated increase in cropland would cause the total amount of erosion for the watershed to remain essentially the same as present. Since sediment rates are a product of erosion, the changes would be similar to the changes in erosion rates. Frequency of flooding and duration of flooding would gradually increase. Water quality from a fisheries standpoint would remain essentially the same. Land treatment could also be installed on marginal land, but the effectiveness would be limited because of inadequate protection.

The selection of land treatment measures is dependent on the soils and the planned crops. Soils that have a wetness problem and are used for row crops, such as cotton and soybeans, require the timely removal of surface water and the improvement of internal drainage. These soils normally have slow permeability that severely restricts percolation and lateral movement of water in the root zone. Drainage field ditches, drainage mains and laterals, structures for water control (pipe drops), and land smoothing or drainage land grading will accomplish the timely removal of surface water where adequate outlets are provided. These measures, combined with crop residue management and conservation cropping systems, also improve the tilth of the soils and remove excess surface water. A complete program is required for maximum benefits of any land treatment measures.

This alternative would not eliminate the need for adequate outlets for onfarm drainage systems. Therefore, the installation of land treatment only would not provide the desired benefits of the project.

Floodproofing and Land Treatment

A levee constructed by the U.S. Army Corps of Engineers completely encircles this watershed.

The Corps has responsibility to provide a surplus water disposal system for the entire watershed. Therefore, this watershed is considered floodproofed from water originating outside the watershed.

This does not preclude the possibility of establishing levees around individual farms or the two hydrologic units. The topography of the watershed is nearly level and problems caused by high rainfall affect large contiguous areas. The high annual direct precipitation would necessitate the installation of pumping plants large enough to remove the water within the leveed areas. In addition, drainage systems within the leveed areas would be needed to convey water to these pumping stations. Floodproofing cropland and pastureland would cost approximately $14,400,000.

The land treatment program would include conservation measures to adequately treat 49,900 acres at a cost of $3,380,300. The conservation measures needed to treat this area would include, but would not be limited to, conservation cropping systems, crop residue management, land smoothing, drainage land grading, drainage field ditches, drainage mains and laterals, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures will be installed singly or in combinations as needed. They will reduce runoff, improve water quality and improve the tilth of the soils.

This alternative would not reduce the requirement for surplus water disposal system to be installed by the U.S. Army Corps of Engineers, nor would it reduce the total miles of channels needed. The additional levees with the required channels would result in an environmentally unacceptable alternative because of the excessive loss of wildlife habitat, damage to the fishery resource, and use of fuels for operation and maintenance.

Channel Work and Land Treatment - Various sizes and lengths of channels were studied to determine whether the 1.5-year, 3-year, or 5-year level of agricultural protection would be the most desirable. The effects of each of these levels of protection were evaluated without and with project conditions. The effects of the 1.5-year and 5-year levels were considered to be alternatives and are discussed in this section. The 3-year level of agricultural protection on which the project is based is discussed in the EFFECTS OF WORKS OF IMPROVEMENT section.

The land treatment measures to be installed for this alternative would be the same as those discussed under the Floodproofing and Land Treatment alternative. The effects of land treatment would be the same for the 3- and 5-year levels of protection; however, the downstream limitation of the 1.5-year level of protection would reduce the effectiveness of the land treatment program, the amount of land that could be adequately treated, and the amount of land disturbed.

Wildlife habitat changes and effects on animal population anticipated with the various levels of agricultural protection were also studied. (See tabulation on the following page).

Smaller Channels - Providing a 1.5-year level of protection would require about 87 miles of channel work. The total installation cost was estimated to be $2,344,000. The annual cost, including operation and maintenance would be $190,000. Average annual flood prevention and drainage benefits would be approximately $163,700. The damage reduction would be about 54 percent. Land used for channels would change in the following manner:

(1) Land within channels would increase from 535 to 542 acres.

(2) Land in berms would increase from 108 to 275 acres.

(3) Land in spoil would increase from 299 to 456 acres.

Land used for channels and berms would increase because channel enlargement would require wider berms to serve as maintenance access. Land occupied by spoil would increase because existing and project-created spoil in forest land would not be spread for channels in most cases.

The land treatment program under this level of protection would include the installation of the necessary conservation measures to adequately treat 26,900 acres. Some conservation measures would be installed on an additional 37,800 acres of cropland and pastureland. The cost would be about $2,309,200. The measures to be installed would include the same features discussed under floodproofing and land treatment.

Type of habitat in which channels are located was categorized according to examples shown in WATERSHED RESOURCES - ENVIRONMENTAL SETTING. Channels located on cropland or pastureland which had no trees or brush on the berms and spoil were categorized as "open land" channels. Channels located in cropland or pastureland having narrow strips of trees or brush on the berms and spoil were categorized as "wooded channel banks." Land used for channels, berms, and spoil within these three categories would change in the following manner:

CHANGES IN HABITAT ACRES AND POPULATIONS OF GAME SPECIES
FOR THE THREE LEVELS OF PROTECTION
JOHNSON BAYOU WATERSHED

Species	Animal Acre Ratio	Preproject		Changes by Alternatives					
				1.5 year level of protection		3-year level of protection		5-year level of protection	
		Acres	Total Animals	Acres	Animals[b]	Acres	Animals[b]	Acres	Animals[b]
Dove[a]	1:3	51,500	17,165	+446	+149	+549	+153	+577	+192
Quail[c]	1:20	51,500	2,575	+446	+ 22	+549	+ 27	+577	+ 29
Squirrel	1:2	22,800	11,400	-446	-223	-549	-275	-577	-289
Deer	1:20	22,800	1,140	-446	- 22	-549	- 27	-577	- 29
Rabbit	1:10	74,300	7,430	a/		a/		a/	
Waterfowl (Resident)	1:150	74,600	495	-446	- 3	-549	- 4	-577	- 4
Waterfowl (Migratory)	1:15	74,600	4,975	-446	- 30	-549	- 37	-577	- 38
Wild Turkey	1:200	22,800	115	-446	0	-549	0	-577	0
Woodcock	1:10	74,300	7,430	a/		a/		a/	

a/ No change.

b/ Represents annual animal losses or gains and does not include 500 acres of forest land clearing that is expected to occur as a result of the project. See page IV-11 for the tabulation related to this 500 acres.

c/ Temporary gain.

(1) Open land acres occupied would increase from 252 to 423 acres.

(2) Wooded channel bank acres occupied would increase from 323 to 462 acres.

(3) Forest land acres occupied would increase from 367 to 393 acres.

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the berm and one side of the channel would be kept partially free of woody vegetation under the maintenance program; see figures 4 and 5. The acres of spoil disturbed in the wooded channel banks would be allowed to grow back into trees by natural plant succession, and those in the forest land would be planted back to trees.

Larger Channels - Providing a 5-year level of protection would require about 90 miles of channel work. The total installation cost would be $3,260,000. The annual cost, including operation and maintenance would be $256,300. The average annual flood prevention and drainage benefits would be approximately $420,500. The damage reduction would be about 78 percent. Land used for channels would change in the following manner:

(1) Land within channels would increase from 535 to 598 acres.

(2) Land used for berms would increase from 108 to 282 acres.

(3) Land used for spoil would increase from 299 to 514 acres.

Land used for channels and berms would increase because channel enlargement would require wider berms to serve as maintenance access. Land occupied by spoil would increase because existing and project-created channel spoil would not be spread for channels in most cases.

The land treatment program would include the installation of the necessary conservation measures to adequately treat 55,500 acres, or 52 percent more than with the 1.5-year level of protection. The cost would be $3,390,500. The measures which would be installed include the same features discussed under Floodproofing and Land Treatment alternative.

Land used for channels, berms, and spoil within the three categories-- open land, wooded channel banks, and forest-- would change in the following manner:

(1) Open land acres occupied would increase from 252 to 451 acres.

(2) Wooded channel bank acres occupied would increase from 323 to 506 acres.

(3) Forest acres occupied would increase from 367 to 437 acres.

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the channel and berm would be kept partially free of woody vegetation under the maintenance program; see figures 4 and 5. The acres of spoil disturbed in the wooded channel banks and forest land would be allowed to grow back into trees by natural plant succession, and those in forest land would be planted to trees.

No Project - This would include only the current land treatment program. At present 9 percent of the watershed has received adequate land treatment. With the No Project alternative, the current rate of installation of land treatment measures would remain the same.

Without a project, land use changes will occur that will increase erosion from 196,000 tons per year to 221,000 tons per year. This is an increase of 13 percent. Sediment being delivered to the watershed outlet will increase from 82,000 tons per year to 93,000 tons per year.

The increased sediment in the channels will reduce the channel capacity, increase the amount of growth of aquatic plants, increase the frequency and duration of flooding, and decrease the quality of water from a fisheries standpoint.

With the "No Project" alternative, the water problem will continue to exist. Sponsors do not have sufficient funds to finance the installation of a complete channel system. Only certain channels would be worked and no orderly, planned procedure would be followed. Appurtenant measures needed to control erosion and sediment would not be installed. Damages incurred with this haphazard approach to the forest land and aquatic ecosystems would not be mitigated. However, the pursuit of this alternative would probably insure continuation of the existing fish and wildlife habitat in areas where this piecemeal approach would not be used. If the project is not installed, net annual benefits of about $585,000 will be foregone.

Reasons for Selecting the Planned Project

The Channel Work and Land Treatment alternative was determined to provide the most practical means of achieving project objectives

and is the selected plan. Other alternatives would fulfill some of the objectives but have no effect on others.

The Land Treatment Only alternative would not appreciably reduce sediment and would have little effect on reduction of wetness problems. The Floodproofing and Land Treatment alternative would produce desired agricultural protection but is more costly and less desirable from an environmental and aesthetic viewpoint.

The tabulation below furnishes data to compare the effects of the three different levels of protection on land area occupied by channels rights-of-way before and after project construction.

ESTIMATED CHANNEL RIGHTS-OF-WAY
UNDER EXISTING AND ALTERNATIVE PROJECT CONDITIONS

Land Area	Existing	Level of Protection		
		1.5 year	3-year	5-year
	acres			
Channel	535	547	578	598
Berm	108	275	282	282
Spoil	299	456	493	514
TOTAL	942	1,278	1,353	1,394
Open Land	252	423	439	451
Wooded Channel Banks	323	462	489	506
Forest Land	367	393	425	437
TOTAL	942	1,278	1,353	1,394

Sediment and turbidity produced during construction by the three levels of protection would not be significantly different. Although the cross-sectional area of channels varies with level of protection, the exposed channel perimeter varies less in proportion. For example, at two randomly selected design points, the cross-sections necessary to provide the three levels of protection studies would result in wetted perimeters of 23.5, 24.5, and 25.5 feet, and 56.2, 59.1, and 61.2 feet, respectively.

The 3-year level of protection requires 89 miles of channel work, 2 miles more than the 1.5-year level of protection, and 3 miles less than the 5-year level of protection.

The reduction in damages for the 1.5-, 3-, and 5-year levels of protection is 54, 70, and 78 percent, respectively.

After due consideration and analysis of alternatives, a system of structural measures as shown on the Project Map, Figure 6, was

selected. A 3-year level of protection was selected from the alternatives studies as a basis for project formulation.

Approximately 128 miles of channels were investigated. This study indicates that 116 miles of channels should be considered for project action in order to provide the level of flood protection and adequate drainage to achieve the project objectives.

The combination of structural and land treatment measures selected balance environmental and economic factors necessary to achieve the project objectives. Fish habitat, aesthetics, health, and water quality will be improved by the project. Wildlife habitat will be affected as illustrated in the tabulation on page 47. The land treatment measures included in the plan are those necessary to achieve the project objectives of reducing soil loss on cropland, improving farming conditions, and reducing wetness problems.

PLANNED PROJECT

Land Treatment Measures

Land treatment measures are the basic elements of watershed projects. They are planned, installed, and maintained by individuals or groups of landowners. Their primary function is to protect and improve the soil and water resources of the land, and to provide runoff retardation, sediment control, and water management. These measures are included as part of conservation plans which will be developed by the land user in cooperation with the Upper Delta Soil and Water Conservation District. The following will be accomplished in regard to the development of plans:

1. Ninety land users will become soil and water conservation district cooperators.

2. One hundred and ten soil and water conservation plans will be developed with land users who are now, or will become, soil and water conservation district cooperators.

3. Forty conservation plans now in use will be revised.

These conservation plans will be based on the use of soils within their capabilities. The capabilities and limitations of soils in specific locations will be determined by the use of soil surveys. Detailed soil surveys will be made on 70,000 acres in the watershed.

Land is adequately treated when it is used within its capabilities and the proper conservation measures have been installed to compensate for its limitations. Land treatment measures necessary to adequately treat 51,900 acres will be installed during the 10-year installation period.

Measures that provide necessary drainage, flood protection, and maintain proper ground cover are most important in planning adequate land treatment in this watershed. Some of the major soil and water conservation measures to be installed and their functions are:

Land Treatment Measures	Function
Bedding	Plowing, blading, or otherwise elevating the surface of flat land to improve surface drainage.

Chiseling and Subsoiling	Loosening the soil without inverting and with a minimum of mixing of the surface, to shatter restrictive layers below normal plow depths that inhibit water movement or root development.
Conservation Cropping System	Growing crops in combination with needed cultural and management measures, including the use of rotation that contain grasses and legumes to improve or maintain good physical condition of the soil; protect the soil during periods when erosion usually occurs; and help control weeds, insects, and diseases.
Crop Residue Management	Using plant residue to protect cultivated fields during critical erosion periods.
Drainage Field Ditch	Constructing open drainage ditches to collect and remove excess water within a field.
Drainage Land Grading	Reshaping the surface of the land to a planned grade to improve surface drainage.
Drainage Mains and Laterals	Constructing open drainage ditches to a designed size and grade to remove surface water for maximum plant growth.
Land Smoothing	Removing irregularities on the land surface to provide a more uniform surface to improve drainage, to obtain more uniformity in planting and cultivation, and to improve equipment operating efficiency.
Pasture and Hayland Management	Properly using or treating pasture and hayland to provide maximum livestock forage and to control erosion.

Pasture and Hayland Management	Properly using or treating pasture and hayland to provide maximum livestock forage and to control erosion.
Pasture and Hayland Planting	Establishing and reestablishing stands of adapted species of perennial, biennial, or annual forage plants for livestock forage and for controlling erosion.
Structures for Water Control (pipe drops)	Using structures where the force of flowing water is sufficient to cause erosion. These structures provide a means of lowering water from a higher elevation to a lower one in a short distance without causing erosion damage.
Wildlife Wetland Habitat Management	Retaining, creating, or managing wetland habitat for wildlife to provide food and cover.
Wildlife Upland Habitat Management	Retaining, creating, or managing areas for wildlife habitats other than wetland to provide food and cover.
Improved Cutting Practices	Harvesting and treating of forest stands to minimize disturbance, encourage growth of a new stand, and improve species composition.
Forest Land Management	Proper using and protecting of forest lands to provide increased realization of wildlife, recreation, timber, and watershed benefits through multiple use.

A complete conservation program on cropland includes chiseling and subsoiling, conservation cropping system, crop residue management, drainage land grading, drainage field ditches, drainage mains and laterals, and land smoothing and structures for water control (pipe drops). The installation of these measures singly, or in combinations as needed, will result in 21,900 acres of cropland being adequately treated. In addition, 400 acres of cropland will be managed to provide wildlife habitat. The remaining 13,100 acres of cropland will have some conservation measures installed.

A complete conservation program on pastureland includes pasture and hayland management, pasture and hayland planting, bedding, and other drainage practices as needed. The installation of these measures will result in 12,600 acres of pastureland being adequately treated. The remaining 8,100 acres will have some measures installed that will contribute to the establishment of a beneficial livestock grazing program.

Land treatment measures on forest land will include treatment on approximately 17,000 acres. Of this amount, improvement cuttings will be done on 7,500 acres and timber stand improvement favoring high humus producing trees will be done on 9,500 acres. The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will provide technical assistance to local authorities, land users, developers, and planning groups. Approximately 10,400 acres of upland and wetland habitat measures will be installed within this same area, with technical assistance provided by the Soil and Water Conservation District and the Soil Conservation Service. Of the 10,400 acres, about 6,300 acres will be retained and managed for wetland habitat and 4,100 acres for upland habitat. These practices will complement practices installed with assistance provided by the Louisiana Forestry Commission.

Even though land users are not obligated to install land treatment measures, past experience has shown that these measures do materialize. For example, the installation periods for six watersheds in the southern part of the State have terminated. In all six watersheds, 100 percent of the planned land treatment measures has been accomplished. In addition, the Agricultural Stabilization and Conservation Service administers programs that provide financial assistance for installing some of the land treatment measures previously discussed.

The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will furnish the technical assistance for forest management on forest lands of the watershed.

Structural Measures

Measures in this plan are comprehensive in nature, with full consideration given to the multiple-use concept of resource planning. The primary benefits that will accrue as a result of project installation will be from flood reduction and improved drainage. Minimizing damages to fish and wildlife while achieving these objectives is an important concern. The U.S. Army Corps of Engineers will provide the floodwater and drainage outlet for this watershed. This outlet, a pumping plant, will be installed concurrently with or prior to the installation of structural measures.

Structural measures consist of channel work which includes excavation, clearing, structures for water control (weirs), and structures for water control (pipe drops). The basis for selection of designs is discussed in detail in the INVESTIGATIONS AND ANALYSES section.

Approximately 116 miles of channels are necessary to achieve project objectives in reducing flood damages and improving drainage. These channels will be referred to herein as "project channels." As shown on the Project Map (Figure 6), 8 miles will be cleared, and 81 miles will be excavated. Ground cover and root armor will be left intact in channels which are cleared only. Twenty-seven miles are adequate and require no work, but will be maintained. Proposed maintenance measures are described on pages 83-85.

With one exception, geologic and engineering investigations and analyses indicated the soils were either clays (CH) or silty clays (CL). This exception and other pertinent information on channel stability is discussed under Geologic Investigations. The stability of the present channels was observed and these observations as well as the "allowable velocity" procedure in Technical Release 25 was used as a basis for stability of planned work analyses.

Classification of the type of channel and flow characteristics of the project channels are as follows:

Type of Channel	Length Project Channel	Length Requiring Work
	miles	
Manmade or previously modified	104	81
Natural or previously unmodified	7	3
Nonexisting or no defined channel	5	5
Total	116	89
Flow Characteristics		
Ephemeral	92	69
Intermittent	19	17
Ponded Water	5	3
Total	116	89

The length and area to be occupied by project channel rights-of-way are shown on the tabulations on the following page.

These flow conditions will remain the same after the project is installed except for changes due to the increase in ponded water created by the installation of structures for water control (weirs).

LENGTH AND AREA OCCUPIED BY PROJECT CHANNELS RIGHTS-OF-WAY

Channel Number	Excavation			Clear Only			Adequate		
		Right-of-Way			Right-of-Way			Right-of-Way	
	Length	Existing	Planned	Length	Existing	Planned	Length	Existing	Planned
	miles	acres		miles	acres		miles	acres	
M-1	14.0	235.9	308.8	4.2	96.5	96.5	1.9	35.3	35.3
L-1A	3.0	15.9	21.1	-	-	-	.1	.5	-
L-1B	-	-	-	-	-	-	7.1	99.3	113.3
L-1B1	2.2	7.0	17.6	-	-	-	.1	.2	0
L-1B2	1.3	1.9	11.2	-	-	-	.1	.3	0
L-1B3	1.5	3.4	11.0	-	-	-	.1	.6	0
L-1B3A	.9	2.2	6.4	-	-	-	-	-	-
L-1B4	1.7	8.2	12.6	-	-	-	.1	.2	0
L-1B5	2.9	8.1	21.4	-	-	-	.1	.2	0
L-1B6	2.0	13.9	25.3	-	-	-	.8	8.2	8.2
L-1B6A	2.4	6.2	33.0	-	-	-	-	-	-
L-1B6B	1.4	3.5	9.9	-	-	-	-	-	-
L-1C	2.0	14.3	19.5	-	-	-	.3	4.4	0
L-1C1	3.4	11.8	21.8	-	-	-	-	-	-
L-1D	1.1	2.7	8.8	.1	.3	.7	1.8	18.9	15.2
L-1D1	2.7	11.7	18.7	-	-	-	-	-	-
L-1E	1.1	4.9	7.2	-	-	-	.1	.4	0
L-1F	1.1	3.2	6.3	-	-	-	.1	.3	0
L-1G	1.6	22.4	22.6	.5	8.3	6.7	.9	10.3	13.1
L-1G1	1.8	6.8	13.0	-	-	-	-	-	-
L-1G2	1.2	4.6	8.9	-	-	-	-	-	-
L-1H	4.1	31.7	38.5	-	-	-	1.6	20.5	21.0
L-1H1	.9	3.7	6.2	-	-	-	-	-	-
L-1I	.7	3.5	6.7	-	-	-	-	-	-
L-1I1	2.2	18.9	19.6	-	-	-	-	-	-
L-1I1A	.1	0	.6	-	-	-	-	-	-
L-1I1B	.2	0	1.3	-	-	-	-	-	-
L-1I2	.8	1.4	5.4	-	-	-	-	-	-
L-1J	1.4	6.3	14.5	-	-	-	1.3	19.3	25.8
L-1J1	1.2	5.9	7.9	-	-	-	-	-	-
L-1K	2.0	11.0	14.6	-	-	-	.9	22.0	0
L-1L	.4	1.1	3.2	-	-	-	-	-	-
L-1M	2.0	12.4	20.6	-	-	-	-	-	-
L-1M1	.6	0	3.4	-	-	-	-	-	-
L-1M2	.6	0	3.4	-	-	-	-	-	-
L-1N	.6	1.3	4.1	-	-	-	-	-	-
L-1N1	.3	0	1.7	-	-	-	-	-	-
L-1N1A	0.8	3.3	5.8	-	-	-	-	-	-
L-2A	-	-	-	.9	5.6	13.6	.2	.6	0
L-2B	3.0	14.0	34.7	.3	2.3	4.8	1.8	22.2	22.1
L-2B1	1.6	6.8	15.4	-	-	-	-	-	-
L-2B3	.9	1.9	8.7	-	-	-	-	-	-
L-2B3A	.8	0	6.9	-	-	-	-	-	-
L-2C	2.6	14.1	32.8	1.1	10.5	16.4	.6	3.9	0
L-2D	-	-	-	-	-	-	4.9	61.3	45.9
L-2D1	.6	1.6	4.6	-	-	-	-	-	-
L-2D2	1.0	5.4	7.7	-	-	-	-	-	-
L-2E	.2	1.0	2.7	.4	3.6	3.6	1.6	11.1	12.6
L-2E1	.2	.6	2.3	-	-	-	-	-	-
L-2E2	.8	2.1	7.4	.2	.5	1.3	-	-	-
L-2F	1.0	5.2	8.5	-	-	-	.5	1.5	1.0
TOTAL	80.9	541.8	894.5	7.7	127.6	143.6	27.1	341.5	313.5

The ponded water will be created in 10 miles of channel previously classified as having ephemeral flow and 16 miles of channel previously having intermittent flow. The types of channel and flow are defined in the coding system on the page following table 3.

The eight structures for water control (weirs), figure 2, will be installed at strategic points in channels to minimize damages to fish and wildlife habitat, reduce downstream sediment following construction, reduce growth of vegetation on the channel bottom during dry season, help preserve existing water supplies necessary to maintain agricultural production, and maintain aesthetics of the landscape. These structures will be installed prior to any work being performed upstream from them and will create approximately 26 miles (99 surface acres) of additional ponded water. These structures are considered temporary appurtenant measures to channel work.

Spoil from the channels will be stacked and smoothed in the forest areas and stacked or spread, as appropriate, in open areas. Short recesses for sediment interception will be excavated where needed at the junctions of principal laterals with the main channels.

As the channel work is being performed, berms will be maintained and spoil will be placed in a manner to allow maintenance equipment access to the channel. Channel crossings will be constructed where necessary for continuity of access. Some crossings will be provided by special construction of structures for water control (pipe drops). Figure 1 shows a typical profile and cross section of a channel.

Figure 3 shows a typical structure for water control (pipe drops). These structures will be installed to prevent erosion and thus protect the channel from excessive sedimentation, reduce maintenance costs, and insure proper functioning of the channels. They are located on the smaller laterals entering project channels. These structures are considered appurtenant measures to channel work.

Project channels will be dug from one side, except special cases for short distances with consideration given to providing the most effective shade for channel water during the summer months. Channel excavation procedures are illustrated by figures 4 and 5.

Construction on channels tributary to the U.S. Corps of Engineers borrow pit will be terminated at a distance ranging from 200 feet to 2,000 feet before entering this channel in order to lessen the adverse effects to fisheries. The intervening undisturbed areas are adequate incised channels which will filter out some suspended sediment. The major beneficial effect of this filtering will be to help reduce turbidity in the channels. The same is planned for channels tributary to Channel M-1, except Channels L-1G, L-1I, L--1K, L-1N, and L-1M. These channels require work (clearing or excavation)

at their confluence with Channel M-1. A sediment trap is planned in Channel L-1K at a point above its entry into Black Lake. For further information on the undisturbed lengths of channels, see the tabulation on page 57.

Approximately 1,353 acres of rights-of-way will be disturbed because of channel work. Approximately 942 acres are occupied by existing channels, berms, and spoil. Therefore, approximately 411 acres of additional rights-of-way will be needed to install the project measures of this watershed. This 411-acre increase is comprised of 187 acres of open land, 166 acres of wooded channel banks, and 58 acres of forest. Several alternatives for establishing vegetative cover on the disturbed areas were evaluated by the Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, and Soil Conservation Service. Due consideration was given to providing the most expedient method of reestablishing vegetation to prevent erosion and to provide food and cover for wildlife. The most practical approach would be to establish a ground cover and plant 165 acres of hardwood seedlings on the project channel spoil in forestland. Seedlings of the following species will be used depending on the soil types and availability: water oak, sweet pecan, and willow oak. The seedlings will be planted the first dormant season after the grass sod is established. If the grass is established during the early part of the dormant season, it would be possible to plant the seedlings the latter part of the same season. A small area will be "scraped" where 1- or 2-year old seedlings will be planted.

Vegetation will be established on rights-of-way and disturbed areas along project channels after heavy or plant-destroying equipment has ceased traveling on the berm. Depending on the season of the year, the crops being grown, and desires of the Sponsor, spreading of the spoil may or may not be accomplished soon after construction. If the spoil will not be spread within 90 days after construction, it will be shaped and seeded. Spoil in forest will be stacked, shaped, and seeded. Depending upon soil type and season of the year, species such as the following can be used - Common bermudagrass, Pensacola bahiagrass, Common lespedeza, Sericea lespedeza, browntop millet, ryegrass, and fescue. This list does not preclude the use of other plants that have value for wildlife and erosion control.

Alteration, modification, or reconstruction of some existing facilities such as bridges, culverts, and pipelines will be necessary to insure proper functioning of planned structural measures. The work on the bridges involves the enlargement of the channel cross section by excavating under the bridge, reinforcing one or more bents of pilings, or lengthening a bridge in order to widen the channel. Work on the culverts involves replacing existing culverts with larger ones, lengthening existing culverts, or lowering the grade of existing culverts. Work on the pipelines involves the lowering or raising of existing pipelines. No bridges, culverts, or pipelines will be relocated.

This alteration, modification, or reconstruction includes, but is not limited to, 1 bridge and 7 culverts on State and Federal highways, 14 bridges and 17 culverts on parish and private roads, private pipelines at 4 locations, 20 fences, 23 water gates, and utility lines at 20 locations. The work will be done concurrently with channel construction. The specific location of existing facilities to be altered is shown on the design profiles and cross sections in the working files. Replacement of any State and Federal highway bridge or culverts will be coordinated with the Louisiana Highway Department early in the design phase prior to construction. Designs will be in accordance with current standards for traffic and type of highway. Structural measure installations are expected to be completed in a 4-year period.

There are no relocations of residences or businesses required.

The disposal of all clearing wastes and construction debris will be accomplished by burying, burning, or removal from the construction site. Burying will limit smoke pollution caused by burning. Burning operations, if necessary, shall be conducted in accordance with the Louisiana Air Control Commission regulations and other applicable laws governing such operations. Noise levels will be monitored and standards of the Occupational Safety and Health Act will be followed.

All construction equipment will be properly equipped with noise resonators. Because of the type of work to be performed, this equipment will be widely dispersed throughout the watershed, rather than concentrated at any one location. Equipment will not be permitted to work when conditions are such that satisfactory control of soil erosion, water, air, and noise pollution cannot be accomplished.

The following specific measures will be used to eliminate or minimize adverse effects to the plant, animal, and aquatic resources.

1. Excavation in forest land will be limited to the side of the channel with the poorest quality habitat with consideration given to providing the most shade possible to the ponded water channels.

2. Excavation in forest land habitat will be minimized.

3. Selected trees will be left on the berms and channel banks for aesthetic and wildlife purposes (see figures 4 and 5).

4. Disturbed areas caused by construction will be revegetated with a ground cover and planted with seedlings beneficial to wildlife species.

5. Structures for water control (weirs) will be installed prior to any upstream channel work.

Approximately 1,353 acres of land will be disturbed during the installation of channel work. Of the total acres that will be disturbed, 942 acres are presently occupied by channel rights-of-way. Under FUTURE WITHOUT PROJECT conditions, there will be 252 acres in open land, 367 acres in forest land, and 323 acres in wooded channel banks being taken up by channel rights-of-way (channels, berms, and spoil). FUTURE WITH PROJECT conditions will require that 439 acres in open land, 425 acres in forest land, and 489 acres in wooded channel banks be taken up by channel rights-of-way. Project installation will cause an additional 187 acres of open land, 58 acres of forest land, and 166 acres of wooded channel banks to be occupied by channel rights-of-way. These changes indicate there will be an overall increase in the "other land" category because of additional right-of-way requirements in open land and forest land. However, since wooded channel banks and existing channels, berms, and spoil are already in the "other land" category, increase will not occur because this is a change within the same land use.

A summary of the changes reveals that there are at the present time 942 acres of land in the watershed taken up by project channel rights-of-way, which will increase to 1,353 acres with the project. The following data summarizes the preceding discussion by wildlife habitat types.

Land Use	Existing Channel R.O.W. (Acres)	With Project Channel R.O.W. (Acres)	Change Due To Project (Acres)
Openland			
Channel	166	187	21
Berm	21	102	81
Excavated Material	65	150	85
Sub-total	252	439	187
Wooded Channel Banks			
Channel	191	207	16
Berm	38	103	65
Excavated Material	94	179	85
Sub-total	323	489	166
Forest Land			
Channel	174	182	8
Berm	50	78	28
Excavated Material	143	165	22
Sub-total	367	425	58
TOTAL	942	1,353	411

There are no properties listed in the National Register of Historic Places that will be affected by the installation of structural measures.

Should any archaeological or historical sites be discovered during the installation of structural measures, construction that would disturb the sites, will be stopped. The Secretary of the Interior (National Park Service), the Curator of Anthropology, and the Historical Preservation Officer will be notified and will be given an opportunity to evaluate and make recommendations for salvage or mitigation before construction continues. Since this is a federally assisted local project, there will be no change in the existing responsibilities of any Federal agency under Executive Order 11593 with respect to archaeological and historical resources.

EXPLANATION OF INSTALLATION COSTS

The total installation cost of the project is estimated to be $6,795,900, of which $2,447,055 will be borne by Public Law 566 funds, and $4,348,845 by other funds (see table 1). Included in the total project cost is $3,862,800 for land treatment measures and $2,933,100 for structural measures.

Land Treatment Measures

Installation costs for needed land treatment measures are to be borne by individual land users. The cost of installing these measures is estimated to be $3,380,300. This includes an estimated $3,031,300 to be spent on cropland and pasture, and $349,000 on forest land. The installation of land treatment measures will insure the timely realization of project benefits and will provide for proper treatment of the land. This plan provides for installation of these measures within a 10-year installation period.

Technical assistance to continue and accelerate the going program of installing land treatment measures is estimated to be $482,500 during the 10-year installation period. Of this amount, $408,400 will be provided by the Public Law 566 funds for acceleration of the going program. The remaining $74,100 will be furnished by other funds under the going programs. Of the remaining $74,100, $57,200 will be provided through The Soil and Water Conservation District Program. The Louisiana Forestry Commission will provide $16,900 of additional technical assistance, of which $2,600 will be provided through the going Cooperative Forest Management Program.

Structural Measures

The total cost of installation of structural measures (channel work) is $2,933,100, of which $2,010,500 is for construction, $140,600 is for engineering services, $369,700 is for land rights, and $412,300 is for project administration. The cost of this work, which includes channel work (excavation and clearing), appurtenant structures for water control (weirs and pipe drops), and vegetative plantings is shown in table 1. The allocation of these costs to their respective purposes are shown in table 2A. These costs include the structural measures construction cost, engineering services cost, and land rights cost.

The cost of excavation and clearing is $1,944,900, of which $1,472,200 is for construction, $103,000 for engineering services,

and $369,700 for land rights. Total land rights costs include $186,700 for the value of land, surveys, and legal fees; $900 for modification or replacement of 1 State and Federal bridge; $47,900 for 14 parish and private bridges; $15,100 for 7 State and Federal culverts; and $72,800 for 27 parish and private culverts. Alteration, modification, or reconstruction of existing miscellaneous facilities such as pipelines and utilities will cost $46,300.

No additional land rights are considered necessary for the installation of appurtenant structures. They will be installed in rights-of-way of channels.

The cost of installing the structures for water control (pipe drops) is $61,600, of which $57,600 is construction cost, and $4,000 is engineering services cost.

The cost of installing the structures for water control (weirs) is $343,800 for construction, and $24,100 for engineering services, for a total of $367,900.

The cost of establishing vegetation on the disturbed areas is $146,400 with $136,900 for construction cost, and $9,500 for engineering services.

The cost of all engineering services ($140,000) includes the direct costs of work to be done by engineers and technicians in relation to structural measures. The work consists of surveys, investigations, designs, and preparation of plans and specifications, including vegetative requirements. The cost of these services will be paid by Public Law 566 funds.

No relocation payments are considered to be required at this time. If they are subsequently required, they will be funded in accordance with paragraph 2 of the Plan Agreement.

The Service and the Sponsoring Local Organization will be responsible for the total cost of items of project administration that each incurs. The costs (estimated to be $412,300) are the administrative costs associated with the installation of structural measures. The Sponsors will bear the other costs which include administration of contracts ($20,100), and local inspections ($2,020) that they believe necessary to ensure themselves the work is being done according to their interest. The Service will bear the costs of inspections ($201,100) that are necessary to protect the interest of the Federal Government and will prepare certificates of completion. Also, the Service will bear the cost of Government representatives and other project administration services it incurs ($189,080). A project agreement will be entered into between the Service and the affected Sponsors before any work is begun.

The costs of measures were estimated using current prices of work of comparable size and complexity and adjusted to local conditions. This was further modified by adding a contingency of about 20 percent to provide a reasonable margin to cover unexpected costs.

All structural measures are multiple purpose, serving both flood prevention and drainage. The total cost of structural measures, excluding project administration, is $2,520,800, of which $1,260,400 is allocated to flood prevention and the same amount to drainage. All costs for multiple-purpose channels with appurtenances were allocated equally to flood prevention and drainage. This is shown on table 2A.

A schedule of obligations for the 10-year installation period, including both land treatment and structural measures, is exhibited on the following page.

Johnson Bayou Watershed

SCHEDULE OF OBLIGATIONS
(Dollars)[a/]

Year	Measures	PL-566 Funds	Other Funds	Total Funds
1st	Construction	111,295	37,105	148,400
	Engineering Services	75,475	---	75,475
	Land Rights	---	249,750	249,750
	Project Administration	29,245	1,655	30,900
	Land Treatment	---	232,900	232,900
	Soil Surveys	7,700	700	8,400
	Technical Assistance	16,900	7,090	23,990
2nd	Construction	698,290	232,760	931,050
	Engineering Services	65,125	---	65,125
	Land Rights	---	119,950	119,950
	Project Administration	135,375	7,675	143,050
	Land Treatment	---	253,900	253,900
	Soil Surveys	7,700	700	8,400
	Technical Assistance	20,200	7,090	27,290
3rd	Construction	698,290	232,760	931,050
	Project Administration	135,325	7,675	143,000
	Land Treatment	---	295,900	295,900
	Soil Surveys	7,600	600	8,200
	Technical Assistance	28,700	7,090	35,790
4th	Project Administration	90,235	5,115	95,350
	Land Treatment	---	334,700	334,700
	Soil Surveys	7,600	600	8,200
	Technical Assistance	36,200	7,090	43,290
5th	Land Treatment	---	362,200	362,200
	Soil Surveys	7,600	600	8,200
	Technical Assistance	41,900	7,090	48,990
6th	Land Treatment	---	364,500	364,500
	Technical Assistance	42,500	7,090	49,590
7th	Land Treatment	---	380,500	380,500
	Technical Assistance	46,200	7,090	53,290
8th	Land Treatment	---	379,000	379,000
	Technical Assistance	44,900	7,090	51,990
9th	Land Treatment	---	389,800	389,800
	Technical Assistance	46,800	7,090	53,890
10th	Land Treatment	---	386,900	386,900
	Technical Assistance	45,900	7,090	52,990
	Total	2,447,055	4,348,845	6,795,900

November 1975

a/ Price base 1975.

EFFECTS OF WORKS OF IMPROVEMENT

Flood Prevention and Drainage

The installation of the combined program of land treatment and structural measures will directly benefit about 49,000 acres of cropland and pastureland. Approximately 7,000 acres of cropland and pastureland will not be affected by project channel work. Although benefits were not calculated on these acres, they will benefit from the accelerated installation of land treatment measures and by rotational systems allowable because of project effects in the benefited areas.

The area directly benefited consists of 28,800 acres of soybeans, 200 acres of cotton, 1,100 acres of corn, 2,000 acres of grain sorghum, and 16,900 acres of permanent pasture. Average annual yields per acre will increase 20 percent for soybeans, 17 percent for cotton, 19 percent for corn, 15 percent for grain sorghum, and 41 percent for pasture.

Forest land downstream from benefited areas, and other forest land lower than the design water surface of adjacent project channels, should remain in forest, except for the 500 acres of forest land that is expected to be cleared as a result of the project. The channels were not designed for the purposes of reducing flooding or increasing drainage in forest land. If such forest land were cleared for agricultural purposes, its flooding and wetness hazards would be greater than those of the benefited areas.

The project will accelerate the establishment of conservation practices and increase the effectiveness of those already on the land. These practices will protect the agricultural resources of the area and improve the environment. Land users will construct and maintain adequate onfarm and group drainage facilities in order that project benefits will accrue.

An estimated 180 farmers will directly benefit from the installation of project measures and land treatment. An additional 20 farmers will benefit from accelerated land treatment only. These measures will provide benefits for an estimated 700 farm family members and farm employees. Other persons dependent on farm trade will also benefit. Benefits will accrue from the financial and technical assistance made available for the installation of the project. This will bring outside monetary resources into the community and will provide an opportunity to use goods, services, and labor from the local area. The use of unemployed or underemployed local labor will be needed during project installation and throughout project life for normal operation and maintenance.

Future land use that will be affected by project construction is indicated in the following tabulation.

	FUTURE WITHOUT PROJECT		FUTURE WITH PROJECT	
Land Use	Acres	Percent	Acres	Percent
Cropland	35,100	43	35,900	44
Pastureland	20,700	25	20,513	25
Forest Land	18,100	22	17,542	21
Other a/	7,800	10	7,745	10
Total	81,700	100	81,700	100

a/ Includes roads, channels, bayous, lakes, communities, and farmsteads, etc. etc.

The preceding tabulation reflects permanent land use changes from one category to another. These changes indicate an overall increase in the "other land" category because of additional right-of-way requirements in open land and forest land. However, since wooded channel banks are already in the "other land" category, there will be no changes shown because of this increase. Spoil will be spread in open land unless the land users request otherwise.

The following summarizes the changes in land use due to project channel installation.

Land Use	Existing Channel R.O.W. (Acres)	With Project Channel R.O.W. (Acres)	Change Due To Project (Acres)
Openland			
Channel	166	187	21
Berm	21	102	81
Excavated Material	65	150	85
Sub-total	252	439	187
Wooded Channel Banks			
Channel	191	207	16
Berm	38	103	65
Excavated Material	94	179	85
Sub-total	323	489	166
Forest Land			
Channel	174	182	8
Berm	50	78	28
Excavated Material	143	165	22
Sub-total	367	425	58
TOTAL	942	1,353	411

Floodwater and drainage effects are discussed together because the problems are inseparable. Channels which remove floodwater also remove drainage water.

The flood prevention and drainage channels will reduce the high risks involved in farming and make it a more profitable business enterprise. Farmers will be able to improve the quality and yields of their crops by improving soil conditions, planting earlier, effectively controlling weeds and grasses, and harvesting at favorable times.

Improved drainage will allow proper timing of cultural practices. Both planting and harvesting can be done efficiently at opportune times. Large equipment can be used on the more level, better-drained fields. Timely planting will increase plant populations and extend the growing period, thereby allowing efficient use of equipment and other factors of production. Improved drainage and flood protection will reduce the frequency of replantings and cultivations, and will allow effective application of land treatment measures. This will promote crop residue management, reduce fall plowing, and permit better rotations of crops in the problem areas. In turn, these practices will conserve soil fertility, reduce average sheet erosion, improve wildlife habitat, help control weed growth, reduce costs, and increase yields.

The estimated average annual yields per acre under WITHOUT and WITH PROJECT conditions are shown as follows:

LAND USE (Units)	WITHOUT PROJECT	WITH PROJECT	UNIT INCREASE	PERCENT INCREASE
Cotton (lbs)	513	600	87	17
Soybeans (bu)	33.6	40.2	6.6	20
Corn (bu)	48.4	57.8	9.4	19
Wheat (bu)	29.3	33.6	4.3	15
Grain Sorghum (cwt)	26.1	29.9	3.8	15
High Management Pasture (cwt)	1.97	2.58	.61	31
Low Management Pasture (cwt)	.80	1.15	.35	44
Supplemental Ryegrass (cwt)	2.00	2.60	.60	30

Project measures will provide adequate protection to agricultural land in the benefit area from a rainstorm which is expected to occur, on the average, once every 3 years. Runoff rates from the 3-year storm will exceed channel capacities, but the flooding duration will not exceed 24 hours. Flooding for this duration will not cause significant damages to crops and pastures. Larger storms will cause significant damages, but the damages will be less than they would be with present conditions. Project structural measures will not affect flood durations or maximum stages outside the benefit area.

Pasture grasses will grow faster and provide better, more desirable forage. Unpalatable, water tolerant weeds will not thrive as well. As a result, stocking rates for livestock will increase and the pastureland will be used nearer to its potential.

Agricultural fertilizer uses will increase because of the project. Estimates of fertilizer use in the future show an increase of about 19 percent, or 200 tons annually. This amount will be less if current research proves successful. This research deals with the time release of nutrients such as inorganic nitrogen which do not remain in the soil for long periods of time. Under continuous cropping, soil fertility would decline without further use of fertilizer. The use of fertilizers now accounts for approximately one-third the production of our total food supply. 1/ The type of fertilizers, timeliness of application and the time and quantity distributions of precipitation-runoff occurrences will control the specific effect of proposed increased fertilizer use on the receiving waters of the watershed and Atchafalaya River. While agri-chemicals, in general, move through the environment attached to sediment and dissolved and suspended in water, fertilizers are likely to be borne by water in a dissolved state, and their effects are most likely to be realized in the form of increased nutrient levels.

Nitrogen and phosphorus are the major elements contained in fertilizers, and forms of these elements serve as plant nutrients. Appendix C discusses some forms as Water Quality Parameters. When nutrients enter aquatic ecosystems they tend to stimulate aquatic plant growth and, generally, tend to increase the biological productivity of a system. Increases in plant growth and algal blooms and associated increases in the aerobic decomposition of organic matter reduce oxygen in the water, lowering the water quality which alters the quality-quantity parameters of fish populations.

Future levels of nitrogen and phosphorous (orthophosphate, nitrite, nitrate and ammonia nitrogen) based nutrients should increase in waters receiving runoff from the watershed. These increased nutrient levels will manifest themselves in degrees of acceleration of the eutrophication process within the water bodies and the associated management problems. The Atchafalaya River will also experience the effects of increased nutrient levels, but to a degree dependent on the frequency and amount of runoff water pumped from the watershed into the river.

The estimated reduction in agricultural flood damages brought about by the 3-year level of protection is 70 percent. This primarily includes the obtaining of yields that are possible with adequate outlets and effective on-farm drainage systems.

1/ U.S. Department of Agriculture, Soil Conservation Service, "Water Pollution from Agriculture," Missouri's All Employees Training Conference - Framework for the Future (Unpublished compilation of speeches and training sessions made at the training conference, 1972), pp. 42-51.

External economies in the watershed will result from the project. Economic agricultural activities will be stimulated by an increased sense of security and the opportunity to plan future developments without consideration of frequent flooding. The flood hazard of communities in the watershed will not change with installation of project measures.

Project channels will be dug from one side, with consideration given to providing the most effective shade for channel water during the summer months. Channel excavation procedures are illustrated by figures 4 and 5.

Aesthetic resources will be affected in the 21 miles of channel to be worked through forest land and 22 miles through open land where woody vegetation grows along the banks. Trees inside the channel rights-of-way may be aesthetically pleasing because of unique characteristics of size, form, color, leaf texture, bark, flowers or fruits. Such trees will be preserved wherever they will not seriously affect construction or operation and maintenance.

Approximately 51,900 acres will be adequately treated as a result of the accelerated land treatment program. The remaining 21,200 acres of crop and pasture land will have some conservation measures installed.

Due to planned land treatment measures, sheet erosion will be reduced from present 196,000 tons per year (2.4 tons per acre per year for the watershed and 5.4 tons per acre per year for 30,800 acres of row cropland) to 183,000 tons per year (2.2 tons per acre per year for the watershed and 4.3 tons per acre per year for 35,900 acres of row cropland). Land use changes that are projected for both WITH and WITHOUT PROJECT conditions explain the apparently minor reduction. These projected land use changes, primarily increases in the amount of land in row crops, will increase the amount of sheet erosion to 221,000 tons per year (2.7 tons per acre per year for the watershed and 5.4 tons per acre per year for 35,400 acres of land utilized for row crops) if the project is not installed.

Erosion of the channels caused by construction will amount to 25,000 tons. This erosion will be spread over a period of 4 years and will amount to approximately 5,000 tons the first year of construction and 20,000 tons for the second, third and fourth years of construction.

Sediment delivered to the watershed boundary will be reduced from 82,000 tons per year to 77,000 tons per year. If the land use conditions are projected through the 10-year installation period, the reduction is from 93,000 tons per year to 77,000 tons per year. This is a project-induced reduction of 16,000 tons of sediment per year.

Since the eight weirs will be installed prior to the construction of channels above them, it is calculated that only 17,000 tons

of sediment derived from construction erosion will be delivered to the watershed boundary.

There will be a net reduction of sediment delivered to the watershed boundary of 68,000 tons during the 10-year installation period.

Water Supply

Project work will not affect water supply.

Fish and Wildlife

Eight structures for water control (weirs) will be installed, resulting in 26 miles and 99 acres of ponded water. The weirs will be beneficial to aquatic life within the channels and also downstream. Although the 99 acres of water will not be high-quality fish habitat, it is expected to support low to moderate populations of commercial fish species. Water depths immediately upstream of the weirs range from 3 to 4 feet. Rotenone and electro shocking sample data at weir sites already installed in other projects indicate low to moderate commercial fish populations in the deeper water areas. During summer months, water temperatures in the upper portions of the ponded water will limit production in these areas. Each pool area will provide additional habitat for amphibians, reptiles, and wading birds. Many species of birds and mammals will have additional watering sites.

Ninety-nine acres of ponded water created by the eight weirs will have an average surface area of 12.4 acres and an average depth of 2 feet. Because of the small size of these impoundments and the shallow water, they will provide poor quality water-based recreation. The weirs are not conveniently accessible to the general public because of their location. For these reasons, no recreation developments are anticipated along the banks. Some bank fishing for catfish is anticipated at the more accessible sites.

The drainage area of the weirs is large enough to provide a frequently flushing action except during extended dry periods. Blue-green algal blooms could occur if extended dry periods materialize. *Anabaena sp.* and *Anacystis sp.* would be the most likely species associated with this condition. The Sponsoring Local Organization will be responsible for identifying problem areas and will consult with local fisheries biologists for remedial measures. Cutrine or similar algaecides will be used to control the algae.

Channel work will be done on 3 miles of channels containing ponded water. Existing commercial fishery is moderate and game (sport) fishery is poor. The benthic community will be destroyed and cover along one bank and in the channel proper will be disrupted. Water temperatures will be increased during the summer months.

A lowering of the biological productivity will result because of the cover and benthic losses, and the increased turbidity levels during construction. Recovery of the biological productivity is dependent upon (1) recovery of the channel and bank cover, (2) recovery of water quality, and (3) recovery of the benthos.

Effects of project construction on the fishery in the 17 miles of intermittent flow channels will be similar to that described for the channels with ponded water. Water temperatures should not significantly change in the intermittent flow channels because they have water in them only during winter, spring, and during periods of storm-water runoff.

Sixty-nine miles of ephemeral channels will be worked. These channels provide habitat for fish food organisms such as crustaceans, amphibians, and larval forms of insects. This production will be temporarily interrupted during construction.

Efforts will be made to avoid creating conditions which will increase populations of vectors which in turn affect public health conditions. For example, openings will be provided in the new sections of spoil to prevent standing, trapped water. These openings will help reduce mosquito production areas. Also, the clearing of channels should reduce mosquito production sites within the channels. The eight project weirs will create 99 surface acres of ponded water which could produce conditions favorable for mosquito production. However, water behind the project weirs is expected to contain gambusia (mosquito fish) and other aquatic organisms that feed on mosquito larvae. If the natural controls are not effective at all times, additional prevention and control measures can be implemented in cooperation with appropriate Federal, State, and local health agencies. Implementation of this project with careful attention to vector and rodent control can result in an overall beneficial impact.

Squirrels reach their highest populations in mature hardwood forests. Squirrels maintain a higher population on existing habitat conditions along channel rights-of-way in forest land and wooded channel banks than what will be present after construction. After about 20 or 30 years, trees should be matured to restore the right-of-way area to its former condition. About 549 acres of bottom land hardwood habitat will be cleared for rights-of-way. Another 500 acres of bottomland hardwoods are expected to be converted to open land as a result of the project. See the tabulation on page 74 for anticipated game population changes.

The clearing of 549 acres of hardwoods will decrease the deer population. White-tailed deer utilize browse, mast, and many other items for food. The plant community that currently exists is more

productive habitat than that following construction. Browse and resting cover will be available on the berm and spoil following construction.

Rabbit habitat along the channel rights-of-way is good and will be good following construction. Grasses will be established on the berms and spoils. Rabbit populations should not significantly change as a result of the project.

The primary habitat for bobwhite quail and mourning doves is the open land areas. Edges of forest land are utilized for nesting. The conversion of 549 acres of forest to open land will cause an increase in both quail and doves. Brush-type habitat will develop on these areas, and about 3 years after clearing, its usefulness for quail and doves will decrease. These brush-type areas are utilized by quail as escape cover.

The effects of this project on the "endangered" animal species that could be visitors in this area will be minimal. There is no habitat which is critical to any known or threatened species that will be affected by the proposed action. The combined effect of this project and other similar projects is further depleting habitat for these species.

CHANGES IN HABITAT AND NUMBER OF GAME ANIMALS
AS A RESULT OF PROJECT CONSTRUCTION

Johnson Bayou Watershed

Species	Habitat	Acres[e/]	Number of Animals
Deer	Forest Land[b/]	-549	- 27
Squirrel	Forest Land[b/]	-549	-275
Dove[a/]	Open Land	+549	+183
Quail[a/]	Open Land	+549	+ 27
Woodcock		No Change	
Rabbit		No Change	
Wild Turkey	Forest Land[b/]	-549	- 3[c/]
Waterfowl (resident)	Forest Land[b/]	-549	- 4
Waterfowl (migratory)	Forest Land[b/]	-549	- 37
Black Bear	Forest Land[b/]	-549	[d/]

a/ Temporary gain
b/ Includes wooded channel banks
c/ If at carrying capacity
d/ Population data not available
e/ This represents the total rights-of-way planned in forest land (425 acres) and wooded channel banks (489 acres) with the existin channel acreage (365) subtracted.

Populations and habitat conditions for nongame animals will be changed. Forest land species should decrease and open land species should increase as the result of right-of-way conversions.

Vegetation, consisting of bottom land hardwoods, will be cleared for channel rights-of-way on 82 acres of Type 1 wetlands. The 82 acres to be cleared are located along Channels M-1, L-1-A, L-1--B-1, L-1-C, and L-1-E. Forest land wildlife species associated with this habitat type will be affected by this loss. The design of these channels is such that the amount and duration of water on the wetlands as a result of direct precipitation will not be affected. However, water introduced onto the wetland as a result of overbank flooding will be reduced on low-intensity rainstorms. The remaining Type 1 wetlands and other wetlands will not be affected by project action.

The following tabulation illustrates the change in game animal populations as a result of the 500 acres of project induced land clearing.

CHANGES IN NUMBER OF GAME ANIMALS AS A RESULT OF 500 ACRES OF THE PROJECTED INDUCED LAND CLEARING

JOHNSON BAYOU WATERSHED

Species	Habitat Type	Acres	Number of Animals a/
Deer	Forest Land	-500	- 25
Squirrel	Forest Land	-500	-250
Dove	Open Land	+500	+167
Quail	Open Land	+500	+250
Woodcock	No Change	-	-
Rabbit	No Change	-	-
Wild Turkey	Forest Land	-500	- 3
Resident Waterfowl	Forest Land	-500	- 3
Migratory Waterfowl	Forest Land	-500	- 33
Black Bear b/	Forest Land		

a/ A undetermined loss of non-game animals will also accompany this 500 acre habitat conversion.
b/ Population data not available.

Archeological, Historic, and Scientific

There are no properties listed in the National Register of Historic Places that will be affected by installation of structural measures. This project will have no effect on any known archeological or historical sites.

There are no known geodetic control survey monuments that are located within the area to be disturbed by the installation of structural measures.

Economic and Social

As a result of the planned project on agriculture, the economic base of the watershed will be enhanced. The project will increase agricultural development, which will increase the profits of processors and sellers of agricultural products as well as other goods. The economy of the area will be enhanced by the higher salaries of those presently employed and those hired to do the additional work.

The higher level of protection will give farmers an incentive to increase production inputs. They will buy better quality seed and will use more fertilizer and lime. Expenditures for products used in harvesting and hauling the product to market will increase. This will stimulate economic activity within the watershed and in the surrounding areas. More jobs will be created in the processing and service industries. The value of property will increase, which will increase the tax base. Thus, the parish will have more funds to develop health, recreational, educational, and other needed facilities.

Installation of the project will create about 78 man-years of local labor for a 4-year period. The expenditure of $3,862,800 for the installation of land treatment measures will create an additional 123 man-years of local labor over a 10-year period. Operation and maintenance will provide 150 man-years of local labor for the life of the project.

The project will help slow the trend of decreasing number of farms and increasing size of farms by increasing the profitability of farming. With the project, optimum-sized labor saving equipment will be more efficiently used on the farms. This and other factors will decrease costs and increase yields. The increase in available jobs will help to slow the out-migration rate.

The gross sales of farm products are expected to increase from approximately $2,117,000 to $2,972,000. The average annual overall net farm income will increase about $1,800 per farm. With this increased and more stable income, the farmer may improve his house or buy a better automobile. He will be able to afford better dental and

health care, more insurance, better clothes, and other amenities of life for his family. He will be able to pay higher wages to his employees who will then be able to improve their living conditions. Minority-group farm families, who comprise an estimated 2 percent of the farm families that would benefit directly from the project, would have an opportunity to raise their incomes above the poverty level.

Local traffic patterns will be interrupted temporarily during the replacement of bridges and culverts resulting in inconveniences to the people involved. Detour routes will be available such that no one will be deprived of access to his destination. Noise levels will increase at the construction sites. Temporary increases in turbidity will occur downstream until the exposed areas are revegetated.

External economies will accrue after the installation of project measures. The increased values of local products and services as a result of activities induced by the project will enhance the overall local economy. The increased production of goods stemming from the project will place new demands on the processing, transporting, and marketing industries within the area. Processors, business establishments and other individuals not directly benefited, will profit from increased sales of their agriculturally-associated goods and products. Suppliers of the additional materials and services required as a result of project-related activities will realize an increased net income. Some agricultural products are processed within the watershed, but most are processed outside of the watershed. The increased production of goods and services induced by the project will stimulate local and regional economic activity.

PROJECT BENEFITS

Project measures will reduce flood damages $208,200 annually (table 5). These benefits include a $198,300 reduction in crop and pasture damages, and $9,900 in indirect damages that include certain losses that result from flooding even though the property involved was not flooded. In addition, farmers will be able to install effective onfarm drainage measures and consequently realize $198,300 annually in drainage benefits (see table 6). Benefits from more intensive land use will be $44,200; employment benefits will be $39,900; and external economies will amount to $95,000. Benefits stemming from more intensive use of cropland reflect increases in yields resulting from increases in efficiency of farming operations and increases in production inputs. Employment benefits result from the use of underemployed and unemployed local labor and represent wages paid for operation and maintenance of project works. External economies displayed in this plan represent those values added over and above the immediate monetary effects of the project as a result of activities attributed to the project.

Good forest land management and protection in the watershed will increase productivity and enhance environmental quality. The forest stands will produce more usable wood products by favoring better timber-producing species. The environment will be enhanced from better wildlife habitat and greater aesthetic beauty of a managed forest.

External economies from a national viewpoint will accrue to this project, but these were not evaluated. Other benefits will accrue in the watershed as indicated in the PLANNED PROJECT section. However, no attempt was made to attach monetary value to these.

COMPARISON OF BENEFITS AND COSTS

Average annual benefits from project structural measures are estimated to be $585,600 (table 6). Average annual cost of structural measures (amortized installation cost plus the cost of operation and maintenance) is estimated to be $234,000. Average annual benefits, excluding external economies, are estimated to be $490,600. The benefit-cost ratio including external economies is 2.5 to 1; the benefit-cost ratio without external economies is 2.1 to 1.

PROJECT INSTALLATION

The project measures will be installed during a 10-year period. Land treatment will be installed during the entire 10 years; structural measures will be installed in the first 4 years. The Sponsoring Local Organization understands its obligations and has agreed to carry out the work during this period.

The Upper Delta Soil and Water Conservation District will provide the overall leadership necessary for the application of the land treatment measures. Land users will be encouraged to install and maintain all needed measures on their land. A study of completed projects with purposes similar to this plan shows that land treatment planned during the project installation period can be accomplished. Plans for their installation and maintenance will be developed with each land user. The agreed-to items will be identified in a conservation plan which will be executed between the individual and the soil and water conservation district.

The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will provide technical assistance in the planning and application of forest land treatment measures. A forester trained in watershed management will be assigned to assist the Sponsors and land users in the installation of any measures.

The Pointe Coupee Parish Police Jury will be responsible for installing all other structural measures. They will be responsible for the local share of cost of construction, acquiring necessary land rights, obtaining improvement changes to all roads, bridges, culverts, utilities, and other existing improvements which are needed. The Point Coupee Parish Police Jury will advertise for, award and administer contracts and make aufficient local inspections to satisfy themselves that specifications are being met. This police jury has power of expropriation and has agreed to use this power as necessary to obtain needed land easements and rights-of-way. Land easements and rights-of-way will be acquired by using Louisiana Revised Statute 38:113, signing of flowage easements, and when necessary, by fee simple title. Appraisals necessary for purchasing easements will be acquired through reputable land and property appraising institutions. Construction permits are required by the U.S. Army Corps of Engineers (Engineering Regulation No. 1165-2-302) for channel work to be done. These permits will be obtained by the Sponsoring Local Organization prior to the installation of any structural measures.

The Service will provide for construction inspection and all other project administration necessary for installation of the planned measures.

The Service will provide all necessary engineering services required for installation of the planned measures.

The U.S. Army Corps of Engineers will provide the flood water and drainage outlet for this watershed. This outlet, a pumping plant, will be installed concurrently with or prior to the installation of structural measures.

FINANCING PROJECT INSTALLATION

Federal assistance will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, Stat. 666) as amended. This assistance is subject to appropriation of funds.

Land users, with aid from Federal and State programs, will bear the expense of installing land treatment measures. The Soil Conservation Service will provide technical assistance under going programs. The Louisiana Forestry Commission in cooperation with the U.S. Forest Service will provide technical assistance in the planning and application of the forest land treatment measures. Funds for the acceleration of technical assistance necessary to insure timely installation of land treatment measures and for soil surveys will be provided by Public Law 566.

The Louisiana Department of Public Works has agreed to provide funds for the local share of cost of structural measures contingent on the appropriation of monies for this purpose by the Louisiana Legislature. The local Sponsors recognize, however, that these funds may not be available or that additional funds may be required. They will be responsible for obtaining additional financing as necessary through normal funding procedures such as taxes or bond issues.

> "Prior to entering into agreements that obligate funds of the Service, the Pointe Coupee Parish Police Jury will have a financial management system for control, accountability, and disclosure of Public Law 566 funds received, and for control and accountability for property and other assets purchased with Public Law 566 funds. Program income earned during the grant period will be reported on the Sponsor's request for advance or reimbursement from the Service."

Land users will provide the Other costs involved in the application of land treatment measures. The Agricultural Conservation and Stabilization Service administers programs that provide financial assistance in the installation of some land treatment measures.

PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of the appropriate Sponsoring Local Organization. The Upper Delta Soil and Water Conservation District, with technical assistance from the Soil Conservation Service, will assist and encourage land users to install and maintain land treatment measures. The objectives will be to maintain adequate drainage, ground cover, and other practices which will protect and conserve soil and water resources. The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the Pointe Coupee Parish Police Jury. In addition to maintaining the 89 miles of project channels with appurtenant structures to be worked, they will continue to maintain the adequate flow conditions of those project channels that are now adequate (27 miles) as indicated on the Project Map, Figure 6. The methodical operation and maintenance of structural measures will insure proper functioning of these measures and realization of benefits.

The present maintenance tax for drainage is considered adequate for maintaining channels and associated works. Should these funds prove inadequate, the Sponsors have agreed to provide additional financing by an increase in revenue from normal taxing procedures.

Channel maintenance includes periodic cleanouts necessary to restore channels to their planned capacities, repair of bank erosion, control of vegetation, and repair or replacement of appurtenant structures. Maintenance of structures for water control (pipe drop) includes repairing rills around headwalls or wingwalls, maintaining or replacing vegetation on fills, repairing worn or broken parts, replacing short-life parts and all other activities essential to the safety and functioning of the structure. The aesthetics of the channel and structure sites shall be an important consideration of the maintenance program.

Annual operation and maintenance expenses for the 116 miles of project channels, including the replacement of worn out or obsolete parts, are estimated to be $44,700. The Pointe Coupee Parish Police Jury will incur this total cost and will maintain these channels at adequate capacity.

Existing public roads, farm roads, turn rows, trails, open areas, and other existing facilities will be used for maintenance equipment to reach the channels. Sufficient access will be available to properly maintain all channels. The channels will be kept clear of excessive vegetation by mowing, hand labor, and use of approved herbicides. The herbicides will be used in areas where mowing and hand labor are not practical. Spraying will be accomplished in the summer months when the ephemeral channels and the intermittent channels are most likely to have the least flow. Spraying during these months will lower the probability of runoff carrying undegraded herbicides into other areas. Eroded banks, side inlets, and other appurtenances will be repaired when in need. Localized sediment accumulations in channels, with and without weirs, will be removed periodically by mechanical means. Use of these techniques should result in a channel maintenance program that is environmentally acceptable.

Vegetation remaining on channel banks not disturbed during construction will be maintained. Trees left in channel rights-of--way for landscape purposes and those planted on spoil banks in the forest areas will not be destroyed by maintenance methods. Two complete mechanical cleanouts are anticipated during the life of the project. The amount of sediment to be removed each time will be small enough to be placed and smoothed on the channel berm.

Provisions will be made for representatives of the Soil Conservation Service, the Louisiana Department of Public Works, and the Sponsors to have free access to all portions of the project measures at any reasonable time for the purposes of inspection, repair, and maintenance. The Sponsors, together with representatives of the Soil Conservation Service, will make a joint inspection annually, after severe storms, and after the occurrence of any other unusual condition that might adversely affect the structural measures.

These joint inspections will continue for 3 years following installation of the structural measures. Inspection after the third year will be made by the Sponsors. They will prepare an annual report and send a copy to the Soil Conservation Service. Items of inspection will include, but will not be limited to, (1) conditions of vegetative cover and growth, (2) need for removal of sediment bars and debris accumulations, (3) brush control in channels, (4) structures for water control (pipe drops and weirs), and (5) general conditions.

The Sponsoring Local Organization fully understands its obligation for operation and maintenance and will execute a specific operation

and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of project measures. The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Johnson Bayou Watershed, Louisiana

Installation Cost Item	Unit	Number Non-Federal Land	Estimated Cost (Dollars)[1/] P.L. 566 Funds SCS[3/]	FS[3/]	Total	Other SCS[3/]	FS[3/]	Total	TOTAL
Land Treatment									
Land Areas									
Cropland	Acres	22,300[5/]	-	-	-	1,334,300	-	1,334,300	1,334,300
Pastureland	to be	12,600	-	-	-	1,697,000	-	1,697,000	1,697,000
Forest Land	treated	17,000[6/]	-	-	-	17,000	332,000	349,000	349,000
Technical Assistance			331,400	77,000	408,400	57,200	16,900[7/]	74,100	482,500
Total Land Treatment			331,400	77,000	408,400	3,105,500	348,900	3,454,400	3,862,800
Structural Measures									
Construction									
Channel Work[4/]									
N	Miles	7	38,400	-	38,400	12,800	-	12,800	51,200
M	Miles	104	1,399,725	-	1,399,725	466,575	-	466,575	1,866,300
O	Miles	5	69,750	-	69,750	23,250	-	23,250	93,000
Subtotal-Construction			1,507,875	-	1,507,875	502,625	-	502,625	2,010,500
Engineering Services			140,600	-	140,600	-	-	-	140,600
Relocation Payments			-	-	-	-	-	-	-
Project Administration									
Construction Inspection			201,100	-	201,100	-	-	-	201,100
Other			189,080	-	189,080	22,120[8/]	-	22,120[8/]	211,200
Relocation Assistance									
Advisory Services			-	-	-	-	-	-	-
Subtotal-Administration			390,180	-	390,180	22,120	-	22,120	412,300
Other Costs									
Land Rights			-	-	-	369,700	-	369,700	369,700
Subtotal-Other			-	-	-	369,700	-	369,700	369,700
Total Structural Measures			2,038,655	-	2,038,655	894,445	-	894,445	2,933,100
TOTAL PROJECT			2,370,055	77,000	2,447,055	3,999,945	348,900	4,348,845	6,795,900

1/ Price base 1975.
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.
3/ Federal agency responsible for assisting in installation of works of improvement.
4/ Type of channel before project: (N) - an unmodified, well-defined natural channel or stream; (M) - manmade ditch or previously modified channel; and (O) - none or practically no defined channel.
5/ Includes 400 acres planted for wildlife habitat.
6/ Includes 10,400 acres retained for wildlife habitat.
7/ Includes $2,600 for going Cooperative Forest Management Program.
8/ Includes $20,100 for administration of contracts and $2,020 for local inspections.

April 1976

TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Johnson Bayou Watershed, Louisiana

Measures	Unit	Applied to Date	Total Cost (Dollars) 1/
Land Treatment			
Bedding	Acres	137	6,200
Conservation Cropping System	Acres	3,156	20,100
Crop Residue Management	Acres	4,760	11,900
Drainage Land Grading	Acres	317	31,700
Drainage Mains & Laterals	Feet	133,274	46,700
Drainage Field Ditches	Feet	60,670	7,300
Land Smoothing	Acres	55	2,200
Pasture & Hayland Management	Acres	2,653	76,900
Pasture & Hayland Planting	Acres	1,295	15,500
Structures for Water Control	Numbers	6	900
Total			219,400

1/ Price base 1975

April 1976

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Johnson Bayou Watershed, Louisiana

(Dollars)[1/]

Item	Installation Cost - P.L. 566 Funds			Installation Cost - Other Funds			Total Installation Cost[4/]
	Construction	Engineering	Total Public Law 566	Construction	Land Rights	Total Other	
CHANNEL WORK[2/]							
Evaluation Unit I							
(M)	95,625	8,900	104,525	31,875	97,500	129,375	233,900
(O)	15,675	1,400	17,075	5,225	32,300	37,525	54,600
Subtotal - Unit I	11,300	10,300	121,600	37,100	129,800	166,900	288,500
Evaluation Unit II							
(N)	38,400	3,600	42,000	12,800	21,900	34,700	76,700
(M)	1,304,100	121,700	1,425,800	434,700	210,500	645,200	2,071,000
(O)	54,075	5,000	59,075	18,025	7,500	25,525	84,600
Subtotal - Unit II	1,396,575	130,300	1,526,875	465,525	239,900	705,425	2,232,300
Project Administration	xxxx	xxx	390,180	xxx	xxx	22,120	412,300
GRAND TOTAL	1,507,875	140,600	2,038,655	502,625	369,700[3/]	894,445	2,933,100

1/ Price base - 1975.

2/ Type of channel before the project: (N) - an unmodified, well-defined natural channel or stream; (M) - manmade ditch or previously modified channel; and (O) - none or practically no defined channel.

3/ Includes $186,700 for value of land, legal fees, and surveys; $136,700 for replacement or modification of bridges and culverts; and $46,300 for modification of pipelines, utility lines, and miscellaneous facilities.

4/ The cost of this work includes channel work (excavation and clearing), appurtenant grade stabilization structures, structures for water control, and vegetative plantings.

April 1976

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Johnson Bayou Watershed, Louisiana
(Dollars)1/

Item	Cost Allocation			Cost Sharing					
	Purpose			Public Law 566			Other		
	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total
MULTIPLE PURPOSE									
Channel Work With Appurtenant Structures	1,260,400	1,260,400	2,520,800	1,075,550	572,925	1,648,475	184,850	687,475	872,325
TOTAL	1,260,400	1,260,400	2,520,800	1,075,550	572,925	1,648,475	184,850	687,475	872,325

1/ Price base - 1975.

April 1976

TABLE 3 - STRUCTURE DATA

CHANNELS

Johnson Bayou Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf-Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value: Aged	"n" Value: As Built	Velocities: Aged	Velocities: As Built	Excavation	Inventory of Chan. Work 1/: Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
M-1	1062+28	3.26	136	140	40.5	0.00050	A= 113.30		P= 34.00		0.060	0.060	1.24	1.24		VI	M	I
	1000+00	3.82	156	241	37.5	0.00050	A= 176.90		P= 46.00		0.060	0.060	1.36	1.36		VI	M	I
	965+76	5.94	225	303	36.0	0.00050	A= 142.00		P= 40.00		0.040	0.023	1.94	3.45		IV	M	I
	896+97	12.89	413	435	35.0	0.00010	27.0	0.01	7.2	2.0:1	0.030	0.023	1.46	1.95		II	M	I
	774+41	25.04	699	825	33.8	0.00010	30.0	0.01	8.8	2.0:1	0.025	0.023	1.97	2.19		II	M	I
	708+10	42.62	949	965	33.1	0.00010	33.0	0.02	9.2	2.0:1	0.025	0.023	2.04	2.27		II	M	I
	227+45	69.56	1364	1368	28.3	0.00010	34.0	0.02	10.9	2.0:1	0.025	0.023	2.25	2.50	428000	II	M	S
	40+00	100.46	1919	3406	26.4	0.00010	A=1327.00		P= 148.00		0.025	0.023	2.57	2.85		IV	M	S
	0+00	101.97	1944	1917	26.0	0.00010	A=1188.00		P= 121.00		0.035	0.035	1.94	1.94		VI	M	S
L-1A	163+68															II	M	E
	4+00														57900	II	M	E
	0+00	1.67		ESTIMATED 2/												VI	M	E
L-1B	377+35	12.80	449	474	36.0	0.00020	A= 234.38		P= 47.04		0.030	0.030	2.04	2.04		VI	M	E
	196+68	18.44	553	959	32.6	0.00020	A= 340.06		P= 55.33		0.025	0.025	2.82	2.82		VI	M	E
	0+00	24.51	709	2346	28.7	0.00020	A= 665.14		P= 77.40		0.025	0.025	3.31	3.31		VI	M	E
L-1B-1	121+44															II	M	E
	4+00														42600	II	M	E
	0+00	2.12		ESTIMATED 2/												VI	M	E
L-1B-2	72+00															II	M	E
	36+00															II	M	E
	2+00			ESTIMATED 2/											26100	I	O	E
	0+00	1.37														VI	M	E
L-1B-3	82+50															II	M	E
	4+00														28500	II	M	E
	0+00	1.33		ESTIMATED 2/												VI	M	E
L-1B-3A	46+86															II	M	E
	0+00	0.45		ESTIMATED 2/											17000	II	M	E
L-1B-4	95+70															II	M	E
	4+00														33300	II	M	E
	0+00	1.35		ESTIMATED 2/												VI	M	E
L-1B-5	159+72															II	M	E
	4+00														56500	II	M	E
	0+00	1.59		ESTIMATED 2/												VI	M	E
L-1B-6	145+66	1.07	54	54	39.9	0.00020	8.0	0.04	4.0	1.5:1	0.040	0.023	0.97	1.72		II	M	E
	134+00	1.27	62	62	39.6	0.00020	8.0	0.04	4.3	1.5:1	0.040	0.023	1.00	2.00		II	M	E
	92+00	1.52	72	101	38.5	0.00020	A= 132.30		P= 41.50		0.060	0.060	0.76	0.76		VI	M	E
	29+00	6.35	210	213	36.6	0.00020	16.0	0.02	5.9	2.0:1	0.040	0.023	1.30	2.21		II	M	E
	0+00	6.48	212	213	36.0	0.00020	16.0	0.02	5.9	2.0:1	0.040	0.023	1.30	2.21	25200	II	M	E
L-1B-6A	126+50	2.31	87	88	39.6	0.00020	9.0	0.03	4.6	2.0:1	0.040	0.023	1.05	1.87		II	M	E
	0+00	3.25	114	112	36.8	0.00020	9.0	0.03	5.2	2.0:1	0.040	0.023	1.12	1.99	66300	II	M	E
L-1B-6B	76+00															II	N	E
	0+00	0.94		ESTIMATED 2/											27600	II	N	E
L-1C	119+25	0.23	15	16	35.0	0.00030	4.0	0.08	2.2	3.0:1	0.045	0.023	0.68	1.36		II	M	E
	16+00	2.63	126	128	32.8	0.00030	14.0	0.03	4.5	1.5:1	0.040	0.023	1.37	2.44	16600	II	M	E
	0+00	3.30	138	378	31.0	0.00030	A= 284.56		P= 52.31		0.060	0.060	1.33	1.33		VI	M	E
L-1C-1	179+50															II	M	E
	15+60															I	O	E
	0+00	1.65		ESTIMATED 2/											65100	II	M	E
L-1D	156+00	0.08	6	13	38.2	0.00070	0.0	0.09	2.2	3.0:1	0.045	0.023	0.90	1.80		II	M	E
	121+50	0.31	19	20	35.6	0.00030	6.0	0.04	2.2	3.0:1	0.045	0.023	0.71	1.42		II	M	E
	100+00	0.39	23	24	34.6	0.00030	6.0	0.04	2.4	3.0:1	0.045	0.023	0.75	1.50	1900	II	M	E
	96+00	0.39	23	26	34.6	0.00030	A= 31.36		P= 18.38		0.045	0.023	1.21	2.42		IV	M	E
	0+00	3.16	133	1160	31.6	0.00030	A= 748.86		P= 109.13		0.060	0.060	1.55	1.55		VI	M	E
L-1D-1	140+00															II	M	E
	0+00	0.89		ESTIMATED 2/											50800	II	M	E

1/ See Attached Coding System for Inventory of Channel Work

2/ Quantities for These Channels Were Estimated Based Upon Visual Observation and Comparison to Surveyed Channels with Similar Characteristics

(continued)
Table 3 - Structure Data Channels
Johnson Bayou Watershed, Louisiana

Channel	Station	Drain-age Area	Capacity Req'd	Capacity Des.	Water Surf-Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation	Inventory of Chan. Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-1E	62+68															II	M	E
	4+00														22700	II	M	E
	0+00	1.35			ESTIMATED 2/											VI	M	E
L-1F	62+70															II	M	E
	4+00														22700	II	M	E
	0+00	0.44			ESTIMATED 2/											VI	M	E
L-1G	172+59	14.18	215	265	37.9	0.00060	A= 207.95		P= 48.89		0.075	0.075	0.98	0.98		VI	M	I
	140+00	14.30	219	220	35.9	0.00060	A= 178.76		P= 44.32		0.075	0.075	1.23	1.23		VI	M	I
	110+00	16.17	286	85	34.1	0.00060	A= 140.84		P= 42.54		0.040	0.023	2.02	3.59		IV	M	I
	25+00	17.00	305	363	33.1	0.00010	24.0	0.01	7.2	1.5:1	0.030	0.023	1.45	1.93	29100	II	M	I
	12+00	17.16	306	419	33.1	0.00010	A= 380.41		P= 91.07		0.035	0.023	1.10	1.71		IV	M	I
L-1G-1	95+25															II	M	E
	0+00	1.46			ESTIMATED 2/										34500	II	M	E
L-1G-2	64+68															II	M	E
	0+00	1.50			ESTIMATED 2/										23400	II	M	E
L-1H	299+47	0.09	7	18	41.8	0.00045	4.0	0.17	2.5	1.5:1	0.045	0.023	0.91	1.82		II	M	E
	280+00	0.47	27	27	40.0	0.00045	6.0	0.17	2.7	1.5:1	0.045	0.023	1.01	2.02		II	M	E
	220+00	1.12	56	60	37.2	0.00045	A= 71.35		P= 28.20		0.070	0.070	1.19	1.19		VI	M	E
	185+00	1.61	74	82	35.6	0.00045	7.0	0.06	42.0	1.5:1	0.040	0.023	1.46	2.60		II	M	E
	25+00	4.77	162	233	34.0	0.00010	14.0	0.01	6.6	1.5:1	0.035	0.023	1.10	1.71	38400	II	M	E
	0+00	4.96	169	337	33.8	0.00010	A= 575.00		P= 125.00		0.070	0.070	0.60	0.60		VI	N	E
L-1H-1	49+50															II	M	E
	0+00	0.26			ESTIMATED 2/										18000	II	M	E
L-1I	39+50	4.11	171	172	36.8	0.00040	14.0	0.04	4.9	1.5:1	0.040	0.023	1.64	2.79		II	M	E
	0+00	4.49	159	172	35.2	0.00040	14.0	0.04	4.9	1.5:1	0.040	0.023	1.64	2.79	4700	II	M	E
L-1I-1	115+00															II	M	E
	0+00	2.41			ESTIMATED 2/										41900	II	M	E
L-1I-1A	5+50															I	O	E
	0+00	0.15			ESTIMATED 2/										2000	I	O	E
L-1I-1B	12+50															I	O	E
	0+00	0.20			ESTIMATED 2/										4500	I	O	E
L-1I-2	40+26															II	M	E
	0+00	0.32			ESTIMATED 2/										14600	II	M	E
L-1J	142+00	2.67	104	104	38.2	0.00010	20.0	0.02	4.6	1.5:1	0.040	0.023	0.84	1.43		II	M	E
	70+00	4.56	167	195	36.7	0.00010	20.0	0.02	5.7	1.5:1	0.035	0.023	1.07	1.66	21400	II	N	E
	0+00	5.15	182	207	36.0	0.00010	A= 323.45		P= 102.00		0.050	0.050	0.64	0.64		VI	N	E
L-1J-1	61+80															II	M	E
	0+00	1.01			ESTIMATED 2/										22400	II	M	E
L-1K	152+47															II	M	E
	55+45															II	M	E
	7+50	Existing Lake Station 7+50 to Station 55+45 Not To Be Disturbed														VI	N	S
	0+00	1.90			ESTIMATED 2/										55300	II	M	E
L-1L	23+50															II	M	E
	0+00	0.34			ESTIMATED 2/										8500	II	M	E
L-1M	103+08															II	M	E
	0+00	2.63			ESTIMATED 2/										37400	II	M	E
L-1M-1	30+36															II	N	E
	0+00	0.45			ESTIMATED 2/										11000	II	N	E
L-1M-2	31+02															II	N	E
	0+00	0.39			ESTIMATED 2/										11300	II	N	E
L-1N	31+00															I	O	E
	29+00															I	O	E
	0+00	0.88			ESTIMATED 2/										11200	II	M	E

1/ See Attached Coding System for Inventory of Channel Work

2/ Quantities for These Channels Were Estimated Based Upon Visual Observation and Comparison to Surveyed Channels with Similar Characteristics

(continued)
Table 3 - Structure Data Channels
Johnson Bayou Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf-Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value: Aged	"n" Value: As Built	Velocities: Aged	Velocities: As Built	Excavation	Inventory of Chan. Work: Type of Work	Before Proj.: Type Chan.	Before Proj.: Flow Cond.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-1N-1	16+00															I	O	E
	0+00	0.57			ESTIMATED 2/										5800	I	O	E
L-1N-1A	44+00															II	M	E
	29+00															II	M	E
	0+00	0.30			ESTIMATED 2/										16000	I	O	E
L-2A	60+00	0.86	45	44	33.2	0.00030	A= 56.80		P= 32.00		0.045	0.023	0.84	1.68		IV	M	E
	8+00	2.11	84	104	31.2	0.00030	A= 99.45		P= 40.00		0.045	0.023	1.05	2.10		IV	M	E
	0+00	2.11	84	116	31.0	0.00030	A= 139.20		P= 37.00		0.075	0.075	0.83	0.83		VI	M	E
L-2B	276+00	0.38	23	24	38.1	0.00015	8.0	0.04	3.0	1.5:1	0.045	0.023	0.64	1.28		II	M	E
	247+04	0.65	36	36	37.3	0.00015	8.0	0.04	3.0	1.5:1	0.045	0.023	0.64	1.28		II	M	E
	158+30	1.35	66	66	35.6	0.00015	10.0	0.04	4.4	1.5:1	0.040	0.023	0.91	1.62		II	M	E
	115+00	2.30	102	102	34.4	0.00035	14.0	0.01	4.8	1.5:1	0.040	0.023	1.00	1.78	15100	II	M	E
	19+00	5.22	202	277	31.0	0.00035	A= 182.14		P= 40.30		0.050	0.050	1.52	1.52		VI	M	E
	2+45	6.38	239	277	30.5	0.00035	A= 182.14		P= 40.30		0.050	0.023	1.52	3.38		IV	M	E
	0+00	6.38	239	341	30.4	0.00035	A= 299.00		P= 55.03		0.075	0.075	1.14	1.14		VI	M	E
L-2B-1	84+00	0.14	10	14	33.8	0.00035	4.0	0.07	2.0	3.0:1	0.045	0.023	0.70	1.40		II	M	E
	56+17	0.48	28	28	32.6	0.00035	6.0	0.07	2.5	3.0:1	0.045	0.023	0.83	1.66		II	M	E
	30+88	0.78	41	45	31.5	0.00035	7.0	0.07	3.0	1.5:1	0.045	0.023	0.93	1.86		II	M	E
	0+00	1.16	58	59	31.0	0.00010	10.0	0.04	4.6	1.5:1	0.045	0.023	0.76	1.52	14100	II	M	E
L-2B-3	50+00	0.03	3	7	36.1	0.00010	4.0	0.01	2.0	3.0:1	0.045	0.023	0.37	0.74		I	O	E
	32+80	0.12	9	9	35.9	0.00010	6.0	0.03	2.0	3.0:1	0.045	0.023	0.39	0.78		I	O	E
	0+00	0.65	29	29	35.6	0.00010	8.0	0.03	3.7	1.5:1	0.045	0.023	0.58	1.16	6300	II	M	E
L-2B-3A	42+00	0.11	8	15	37.7	0.00040	4.0	0.06	2.0	3.0:1	0.045	0.023	0.75	1.50		I	O	E
	0+00	0.35	18	18	36.0	0.00040	4.0	0.06	2.2	3.0:1	0.045	0.023	0.79	1.58	8700	I	O	E
L-2C	230+00	0.15	10	11	38.3	0.00020	4.0	0.04	2.0	3.0:1	0.045	0.023	0.53	1.06		I	O	E
	189+40	0.44	26	27	38.3	0.00020	6.0	0.04	2.8	3.0:1	0.045	0.023	0.67	1.34		I	O	E
	152+60	0.94	48	51	36.5	0.00020	8.0	0.04	3.5	1.5:1	0.045	0.023	0.78	1.56		II	M	E
	130+60	1.15	57	58	35.9	0.00020	10.0	0.04	3.8	1.5:1	0.040	0.023	0.97	1.94		II	M	E
	90+00	1.70	79	77	34.9	0.00020	12.0	0.03	4.1	1.5:1	0.045	0.023	1.04	2.08	27000	II	M	E
	30+00	2.30	102	142	33.7	0.00020	A= 132.19		P= 37.90		0.045	0.023	1.07	2.14		IV	M	E
	0+00	3.94	160	291	32.5	0.00020	A= 312.61		P= 57.30		0.070	0.070	0.93	0.93		VI	M	E
L-2D	256+12	1.51	72	98	38.0	0.00010	A= 112.96		P= 31.60		0.040	0.040	0.88	0.88		VI	M	E
	147+35	3.60	148	180	36.9	0.00010	A= 160.39		P= 37.23		0.035	0.035	1.20	1.20		VI	M	E
	0+00	6.79	252	1652	30.6	0.00040	A= 513.26		P= 69.56		0.035	0.035	3.22	3.22		VI	M	E
L-2D-1	30+00	0.43	25	25	35.1	0.00045	6.0	0.07	2.9	1.5:1	0.045	0.023	1.12	2.24		II	M	E
	0+00	0.65	36	36	33.8	0.00045	6.0	0.07	3.1	1.5:1	0.045	0.023	1.12	2.24	1700	II	M	E
L-2D-2	50+80	0.08	6	17	39.7	0.00100	4.0	0.13	2.0	1.5:1	0.045	0.023	1.21	2.42		II	M	E
	40+00	0.28	18	20	38.6	0.00010	5.0	0.07	2.0	1.5:1	0.045	0.023	1.25	2.40		II	M	E
	0+00	1.11	56	57	38.0	0.00010	8.0	0.07	4.9	1.5:1	0.045	0.023	0.76	1.52	6500	II	M	E
L-2E	117+47	0.56	33	34	38.0	0.00015	10.0	0.02	2.9	3.0:1	0.045	0.023	0.62	1.24		II	M	E
	106+00	0.81	45	47	37.8	0.00015	10.0	0.02	3.4	3.0:1	0.045	0.023	0.68	1.36	1100	II	M	E
	61+43	0.98	50	55	36.8	0.00015	A= 92.47		P= 33.99		0.060	0.060	0.59	0.59		VI	M	E
	40+00	1.10	55	62	36.4	0.00015	A= 77.67		P= 28.00		0.040	0.023	0.80	1.42		IV	M	E
	6+00	1.10	55	151	33.0	0.00100	A= 67.00		P= 24.50		0.050	0.050	1.84	1.84		VI	M	E
	0+00	1.10	55	106	30.0	0.00150	A= 60.00		P= 24.00		0.060	0.060	1.76	1.76		VI	M	E
L-2E-1	9+70	0.30	19	19	38.4	0.00010	8.0	0.05	2.6	3.0:1	0.045	0.023	0.47	0.94		II	M	E
	0+00	0.40	24	24	38.3	0.00010	8.0	0.05	2.9	3.0:1	0.045	0.023	0.50	1.00	1300	II	M	E
L-2E-2	53+26	0.03	3	15	40.7	0.00040	4.0	0.05	2.0	3.0:1	0.045	0.023	0.75	1.50		II	M	E
	8+50	0.20	13	15	38.4	0.00040	4.0	0.05	2.0	3.0:1	0.045	0.023	0.75	1.50	3000	II	M	E
	0+00	0.25	16	15	38.0	0.00040	A= 19.13		P= 15.18		0.045	0.023	0.79	1.58		IV	M	E
L-2F	78+00	0.22	14	17	37.1	0.00140	3.0	0.18	2.0	3.0:1	0.045	0.023	1.38	2.76		II	M	E
	66+00	0.35	21	28	35.4	0.00140	4.0	0.18	2.0	3.0:1	0.045	0.023	1.40	2.80		II	M	E
	57+00	0.43	25	27	35.2	0.00020	6.0	0.02	2.8	1.5:1	0.045	0.023	0.67	1.19		II	M	E
	24+28	1.25	61	64	34.5	0.00060	10.0	0.02	4.0	1.5:1	0.040	0.023	1.00	1.78	4800	II	M	E
	9+00	1.34	65	667	33.1	0.00300	A= 366.50		P= 110.00		0.100	0.100	1.82	1.82		VI	M	E
	0+00	1.34	65	588	30.3	0.00300	A= 162.00		P= 37.00		0.060	0.060	3.63	3.63		VI	M	E

1/ See Attached Coding System for Inventory of Channel Work

2/ Quantities for These Channels Were Estimated Based Upon Visual Observation and Comparison to Surveyed Channels with Similar Characteristics

Soil Conservation Service

Coding System for Inventory of Channel Work

Type of Work

- I - establishment of new channel including necessary stabilization measures
- II - enlargement or realignment of existing channel or stream
- III - cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
- IV - clearing and removal of loose debris within channel section
- V - stabilization as primary purpose (by continuous treatment or localized problem areas). (Present capacity adequate)
- VI - adequate

Type of Channel Prior to Project

- N - an unmodified, well-defined natural channel or stream
- M - manmade ditch or previously modified channel
- O - none or practically no defined channel

Flow Condition Prior to Project

- Pr - perennial - flows at all times except during extreme drought
- I - intermittent - continuous flow through some seasons of the year but little or no flow through other seasons
- E - ephemeral - flows only during periods of surface runoff
- S - ponded water with no noticeable flow, caused by lack of outlet or high ground water level

TABLE 3A - STRUCTURAL DATA
STRUCTURES FOR WATER CONTROL (WEIRS)
JOHNSON BAYOU WATERSHED, LOUISIANA

Channel	Station 1/	Elevation of HG (ft. msl)	Height (ft)	Crest Elev. (ft. msl)	Depth (ft) 2/	Crest Width (ft)	Side Slope	Length (ft)
M-1	225+00	28.3	4.0	20.3	8.0	88	2:1	136
	500+00	31.0	3.2	24.6	6.4	65	2:1	107
	774+00	33.8	2.9	27.9	5.9	60	2:1	100
	965+00	35.6	2.4	30.8	4.8	53	2:1	88
L-1B	60+00	29.8	3.2	23.3	6.5	43	2:1	78
	175+00	32.0	3.2	25.5	6.5	42	2:1	84
	245+00	33.4	3.0	27.5	5.9	41	2:1	83
L-1G	20+65	33.2	2.3	28.4	4.8	38	2:1	78

1/ Locations of weirs are approximate. Final locations will be determined during construction stage.

2/ Difference between hydraulic gradient and crest elevations.

November 1975

TABLE 4 - ANNUAL COST

Johnson Bayou Watershed, Louisiana

(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation and Maintenance Cost	Total
I	18,600	10,100	28,700
II	144,100	34,600	178,700
Project Administration	26,600	-	26,600
Grand Total	189,300	44,700	234,000

1/ Price base - 1975
2/ 50 years @ 6-1/8 percent interest.

April 1976

TABLE 5 - ESTIMATED AVERAGE ANNUAL
FLOOD DAMAGE REDUCTION BENEFIT

Johnson Bayou Watershed, Louisiana

(Dollars) 1/

Item	Estimated Average Annual Damage Without Project	With Project	Damage Reduction Benefits
Floodwater			
Agricultural Crop and Pasture	281,500	83,200	198,300
Indirect	14,100	4,200	9,900
Total	295,600	87,400	208,200

1/ Price base: Current normalized prices, WRC, November 1975.

April 1976

TABLE 6 - COMPARISON OF BENEFITS AND COSTS

Johnson Bayou Watershed, Louisiana

(Dollars)

Evaluation Unit	Average Annual Benefits							
	Damage Reduction[1]	More Intensive Land Use[1]	Drainage[1]	Employment Redevelopment[2]	External Economies[1]	Total	Average Annual Cost[3]	Benefit Cost Ratio
I	51,800	11,000	49,300	4,700	25,100	141,900	28,700	4.9:1
II	156,400	33,200	149,000	35,200	69,900	443,700	178,700	2.5:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	26,600	xxx
GRAND TOTAL	208,200	44,200	198,300	39,900	95,000	585,600	234,000	2.5:1

[1]Price base: current normalized prices, November 1975.
[2]Price base: 1975.
[3]Installation cost-1975 prices amortized for 50 years at 6.125 percent; operation and maintenance cost-1975 prices.

INVESTIGATIONS AND ANALYSES

The investigations and analyses of this project were made with complete coordination with the U.S. Army Corps of Engineers. Specifically, hydraulic and hydrologic, engineering, and economic investigations and analyses were necessary because the successful implementation of both agencies' plans depended on the other. This is discussed further in the Plan Formulation section of this plan.

Land Treatment

The U.S. Department of Agriculture, under the leadership of the Soil Conservation Service, has published the Conservation Needs Inventory for Pointe Coupee Parish. This inventory provided information on land capability subclasses by land use. Agricultural workers in the parishes supplied information on soils, land capability, and land use. This information, along with technical guidance, was used to develop land treatment needs for the watershed.

Conservation measures applied to date were determined from farm operators and from a study of field office records. This information was used in preparing table 1A.

Conservation measures to be applied during the installation period were determined after careful consideration of the following factors:

1. Basic needs of the watershed
2. Personnel available for planning in the field office
3. Experience gained from the installation of other projects
4. Interviews with farm operators regarding their resources, desires, and willingness to install needed land treatment measures.

Hydraulic and Hydrologic Investigations

Basic data were assembled from the following sources:

1. U.S. Coast and Geodetic Survey quadrangle maps
2. Aerial photographs

3. U.S. Environmental Data Service frequency analyses
4. Field surveys
5. U.S. Army Engineers streamflow records
6. Field observation
7. General Soil maps
8. Land use inventory
9. Fish and wildlife assessments
10. Special agency reports

Hydraulic engineers measured the capacities of existing watershed channels for carrying storm runoff. Stage-discharge relationships were determined at regular intervals along each surveyed channel by the slope-area method. "Design" hydraulic gradients, or water surface profiles, were superimposed on plotted channel profiles at elevations above which prolonged flooding significantly damages crops. Channel segments were deemed adequate where the measured capacities below the design gradients equaled the design flows.

Design flows for agricultural drainage were computed with the formula $Q = CM^{5/6}$, where Q is the required capacity in cubic feet per second, C is the coefficient related to level of protection, and M is the drainage area in square miles. Research and long-term observations by drainage engineers have verified the relationship between drainage area and required discharge. Recent research has identified the relationship between the coefficient and storm runoff volume.1/ This relationship was applied to the runoff volume of a 3-year storm to determine the required coefficient of 51 for cropland and pastureland. Smaller coefficients, which reflect slower rates of runoff, were determined for forest land. A coefficient of 26 was determined for all forest land except the ridge and slough area northeast of Lettsworth. This area was assigned a coefficient of 10 because of its large amount of surface storage and its restricted outlet capacity, which will not be changed under project conditions. Project channels will reduce the frequency of significant damage to crops and pastures above the design gradient to an average of not more than once in 3 years. The peak flow from a 3-year storm will be out-of-banks, but the storm flow will not remain above the design gradient more than about 24 hours. Flooding of this duration will not cause significant crop and pasture damage.

1/ "Using the Cypress Creek Formula to Estimate Runoff Rates in the Southern Coastal Plain and Adjacent Flatwoods Land Resource Areas." ARS 41-95, Agricultural Research Service, John C. Stephens and W. C. Mills, February 1965.

The reduction in average annual damaging overbank flow to be brought about by project channels was determined by using a curve of proportional runoff volumes (ordinates) against probability. Proportional runoff volumes corresponding to FUTURE WITHOUT PROJECT and FUTURE WITH PROJECT probabilities of damaging overbank flooding were set as lower limits of areas under the curve. The areas represent average annual damaging overbank flow volumes and were assumed to be proportional to damages induced by water.

Engineering Investigations

The following studies were made to determine the structural measures which would be installed:

1. U.S. Geological Survey quadrangle maps were used as a base in preparing a planning map showing the watershed boundary, proposed channels, drainage patterns, systems of roads, and other pertinent data.

2. The Sponsors agreed upon the locations of channels they wished investigated.

3. Designs were made on these channels which would provide 1.5-year, 3-year, and 5-year levels of protection. Designs and cost estimates were developed for each of the three levels of protection.

4. The watershed was divided into two areas of priority based on the Sponsors' suggestions. The first priority is that area in greatest need of immediate attention. This area drains into the borrow pit created by the excavation of fill material for construction of the West Guide Levee of the Morganza Floodway. This area is affected by Channels L-2A through L-2F and their tributaries. Sufficient surveys and designs to allow an invitation for bids and preparation of land rights maps were made for this area.

The following abbreviated survey procedure was used on the remaining areas:

Field surveys were made on a representative sample of the remaining channels. Designs and cost estimates for the planned measures of these surveyed channels were developed. Design flow for channel work was computed from general formulae as described under "Hydraulic and Hydrologic Investigations." Costs of the unsurveyed channels were estimated from relationships obtained for the surveyed channels in this watershed and other watersheds with similar characteristics.

The design "n" values for "aged" channels range from 0.025 to 0.045, depending on the value of the hydraulic radius as shown in the following tabulation:

HYDRAULIC RADIUS	"n"
Less than 2.5	0.040 - 0.045
2.5 to 4.0	.035 - .040
4.0 to 5.0	.030 - .035
More than 5.0	.025 - .030

The "n" values for "as built" channels range from 0.020 to 0.025. All channels have been designed to meet the criteria for stability in Technical Release 25, taking into account allowable flow velocities in view of soil materials present.

The existing drainage system has been modified periodically. However, only a small number of main channels have been dug in recent years. In areas where project channels will outlet through these old channels, the outlets were investigated to determine their stability. Channels were designed so that excavation will be terminated prior to entering erodible outlet sections. Outlet sections that are covered with natural vegetation and show no evidence of active erosion are considered safe and stable outlets for project channels as long as no additional drainage area is added to the channel.

Estimated unit costs of structural measures were based on the going rate of similar work in the general area, with adjustments for special conditions which exist. Land rights maps for all channels in the area of highest priority were prepared. Some locations of channels in the remaining priority areas will need to be made during the operations stage of the project.

The Sponsors furnished ownership information. The locations of the proposed channels were checked against the ownership map to eliminate channels benefiting only one ownership or resulting primarily in bringing new land into agricultural production.

After the land treatment measures and those structural measures needed for flood prevention and drainage had been determined, a table was developed which gave the cost of each measure. The summation of the total costs for all needed measures represents the estimated installation costs of the project (table 1). A second table was developed to show the annual costs of installation and operation and maintenance of the structural measures (table 4). Pertinent physical data for individual structural measures are summarized in table 3.

Geologic Investigations

Channel Stability studies were conducted in accordance with accepted Soil Conservation Service procedure. Six locations were selected for soil sampling, three on each of two representative channels. Each location was hand augered and logged, and representative soil samples were collected. These samples were analyzed for grain-size distribution, plasticity indices, and dispersion characteristics.

Materials encountered include CH, CL, and ML. Some of the CL and ML materials had critical dispersion, but most of this material was found below the grade of the channel.

Channels were designed according to the limitations of the materials as expressed in Technical Paper 25.

Channels were designed for velocities less than 3 feet per second. Past experience indicates that this velocity will not erode the material.

Materials encountered during the stability investigation were taken into consideration when estimating costs of structures for water control and maintenance. During the final design stage, the segment of Channel M-1 where dispersed material will effect the bank stability will be delineated. Should erosion create problems in this area prior to vegetative cover being established, provisions for repair will be made.

Sedimentation Investigations

Sheet erosion was calculated by use of the Universal Soil Loss Equation. This equation states that A = RKLSCP where:

A = Sheet erosion, tons per acre per year

R = Rainfall factor

K = Soil factor, basic erosion rate in tons per acre per year for each soil series or unit

L = Slope - length factor

S = Slope - gradient factor

C = Cropping and management factor

P = Erosion control practice factor

For a discussion on the background of this formula, see page 17-7 of "Handbook of Applied Hydrology," edited by Ven Te Chow.2/

For purposes of computing sedimentation, each evaluation unit was analyzed separately. This allowed a more definitive approach as to delivery ratios and downstream effects.

Present cover factors were based on observation and records of amounts and type of land treatment measures that had been applied. Future cover factors without project conditions were estimated according to the normal rate of application of land treatment measures. Future cover factors with project conditions were estimated according to the expected accelerated rate of application of land treatment measures. This will be accomplished by accelerated technical assistance.

The sediment yields to specific points were calaculated using a sediment delivery ratio that is a function of the drainage area. Its accuracy has been established through sedimentation surveys. Trap efficiencies of water control structures were calculated as functions of location and grain size as indicated by previous sedimentation surveys conducted by the Agricultural Research Service and the Soil Conservation Service.

The amount of channel bank erosion which will occur due to construction was calculated as functions of type of material being disturbed, size of channel, methods of contruction, and vegetative practices which are to be used in construction. The reduction in sediment due to land treatment and structural measures will exceed the amount of erosion instigated by construction.

Ground Water and Mineral Investigations

Ground water and mineral investigations consisted of a review of pertinent literature.

Archaeological, Historic, and Scientific Investigations

Scanning the "National Register of Historic Places," written communications with the Curator of Anthropology of Louisiana State University, and oral communications with local historians provided some of the data for this section. Other data was obtained by contracting with Louisiana State University to make a complete archeological and historical survey of the watershed.

2/ Ven Te Chow, "Handbook of Applied Hydrology" (New York: McGraw-Hill Book Company, 1964), p. 17-7.

Forestry Investigations

A field survey showed ground cover, forest, and hydrologic conditions and treatment needs. This survey, supporting data, and information from other agencies and forestry officials determined the amount of remedial measures needed. These needs were adjusted to meet the anticipated participation by land users in the watershed.

Fish and Wildlife Investigations

Several field trips were made in this watershed by biologists of the U.S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, and the Soil Conservation Service. The proposed works were reviewed in the field with the aid of topographic maps, aerial photographs, and other pertinent data provided by the Soil Conservation Service. Any proposed works in the vicinity of high value aquatic and terrestrial habitat were evaluated.

Following the field trips, both the U.S. Fish and Wildlife Service and the Louisiana Wild Life and Fisheries Commission submitted reports listing suggestions to minimize adverse damages to the fish and wildlife resources. These suggestions were considered in formulating this plan. As a result of the six (6) recommendations made by the U.S. Fish and Wildlife Service in their letter dated January 4, 1973, the following actions were taken:

Recommendation No. 1: Channel sections terminating in woodlands be eliminated.

Response: This recommendation was implemented. All project channels were terminated before effecting the area of concern north and east of Bayou Lettsworth. No project channels terminate (at the upper end) in woodlands. Construction on channels tributary to the U.S. Corps of Engineers borrow pit will be terminated at a distance ranging from 200 feet to 2,000 feet before entering this channel in order to lessen the adverse effects to fisheries. The same is planned for channels tributary to Channel M-1, except Channels L-1G, L-1I, L-1K, L-1M, and L-1N. These channels require work (clearing or excavation) and are not in forestland at their confluence with Channel M-1.

Recommendation No. 2: Vegetation cleanout be substituted for excavation of Channel M-1 where it passes through woodlands.

Response: The lower 4,000 feet of Channel M-1 is adequate (no work required). The next 18,745 feet upstream is to be cleared only of woody vegetation. The remainder of Channel M-1 will be enlarged in order to fully accomplish the project objectives.

Recommendation No. 3: Consideration to be given to weir placement in Channel M-1.

Response: This recommendation was implemented. Four weirs are planned in Channel M-1. Three weirs are planned in Channel L-1B. One weir is planned in Channel L-1G.

Recommendation No. 4: Excavation of channels bordering woodlands be accomplished from the cleared side and spoil placed to prevent further drainage of these woodlands.

Response: This recommendation was implemented.

Recommendation No. 5: All channel rights-of-way be vegetated with appropriate hardwoods and shrubs of value to wildlife.

Response: This recommendation was partially implemented. All disturbed channel rights-of-way will be vegetated. Also, 165 acres of hardwood seedlings will be planted on project channel spoil in forest land. There are several objectives for doing this. Some are: (1) to prevent erosion and resulting sedimentation, (2) to maintain water quality, and (3) to provide food and cover for wildlife.

Recommendation No. 6: Revegetated rights-of-way be protected from disturbance or destruction for the life of the project.

Response: Public Law 566 requires that all phases of the structure measures be maintained by the sponsors. However, special techniques for this are discussed in the provisions for operation and maintenance. (See page 83 and 84).

Preproject habitat conditions and populations of game and fish species were determined from a review of available literature, data provided by the Louisiana Wild Life and Fisheries Commission

and field investigations. Postproject population changes were estimated after a determination was made of the habitat lost or gained because of the project.

Water quality data was collected and samples analyzed using a Hach DR/2 Spectrophotometer and Hach pH and oxygen kits. Samples were collected monthly at (1) borrow pits located near the outlet (Pointe Coupee Drainage Structure) at the southern tip of the area, (2) Johnson Bayou at Highway 417 crossing, and (3) Fisher Bayou at Highway 1 crossing.

Fish populations were sampled in Johnson Bayou and the borrow pits. Biologists with the Louisiana Wild Life and Fisheries Commission and the Soil Conservation Service took the samples using rotenone in May 1975 and a gill net in March 1976.

An inventory of wetland types and ponds was conducted. Wetland types were classified according to guidelines in USDI Circular No. 39. Project effects on lakes, ponds, and wetland types were determined.

Economic Investigations

The following data were developed:

1. Estimated yields and production costs for crops and pasture grown under various conditions

2. Land use and production under future conditions both without and with the project

3. Associated costs induced by the project

4. Flood damage reduction to crop and pasture because of the project

5. Coordination of direct primary agricultural benefits was accomplished with the U.S. Corps of Engineers

6. Increased returns because of increased quality of products

7. Reduction in crop production cost because of the project

8. External economics stemming from or induced by the project

Trend clearing (past history) of bottomland hardwoods in the watershed is used as a basis for estimating the amount of this clearing that is expected to take place "without the project".

That is, the amount that is expected to be cleared regardless of whether or not there is a P. L. 566 project. Therefore, the amount expected to be cleared "with the project" includes this (without or regardless of the project) plus the project right-of-way clearing, and the project included clearing.

The following items of consideration were included in determining the amount of P. L. 566 project induced clearing. (Does not include project channel rights-of-way or land expected to be cleared.

1. Location of the forestland in relation to any particular P. L. 566 project channel.

2. Soil association or soil capability class.

3. Elevation.

4. Ownership patterns.

5. Local (SCS) knowledge of individual landowner's past performances.

Basic data were obtained from residents of Pointe Coupee Parish, to include local farmers, agricultural workers, parish officials, experiment stations, other published and unpublished agricultural information, the 1970 U.S. Census of Population, and the 1969 Census of Agriculture. Parish statistics used were considered representative of the watershed.

The watershed was divided into two evaluation units with hydrologically independent water problems. The Project Map (Figure 6), has the evaluation units delineated on it. Economic effects of project measures in each unit were evaluated separately from the other units. Procedures prescribed in the Economics Guide were used in the evaluation.

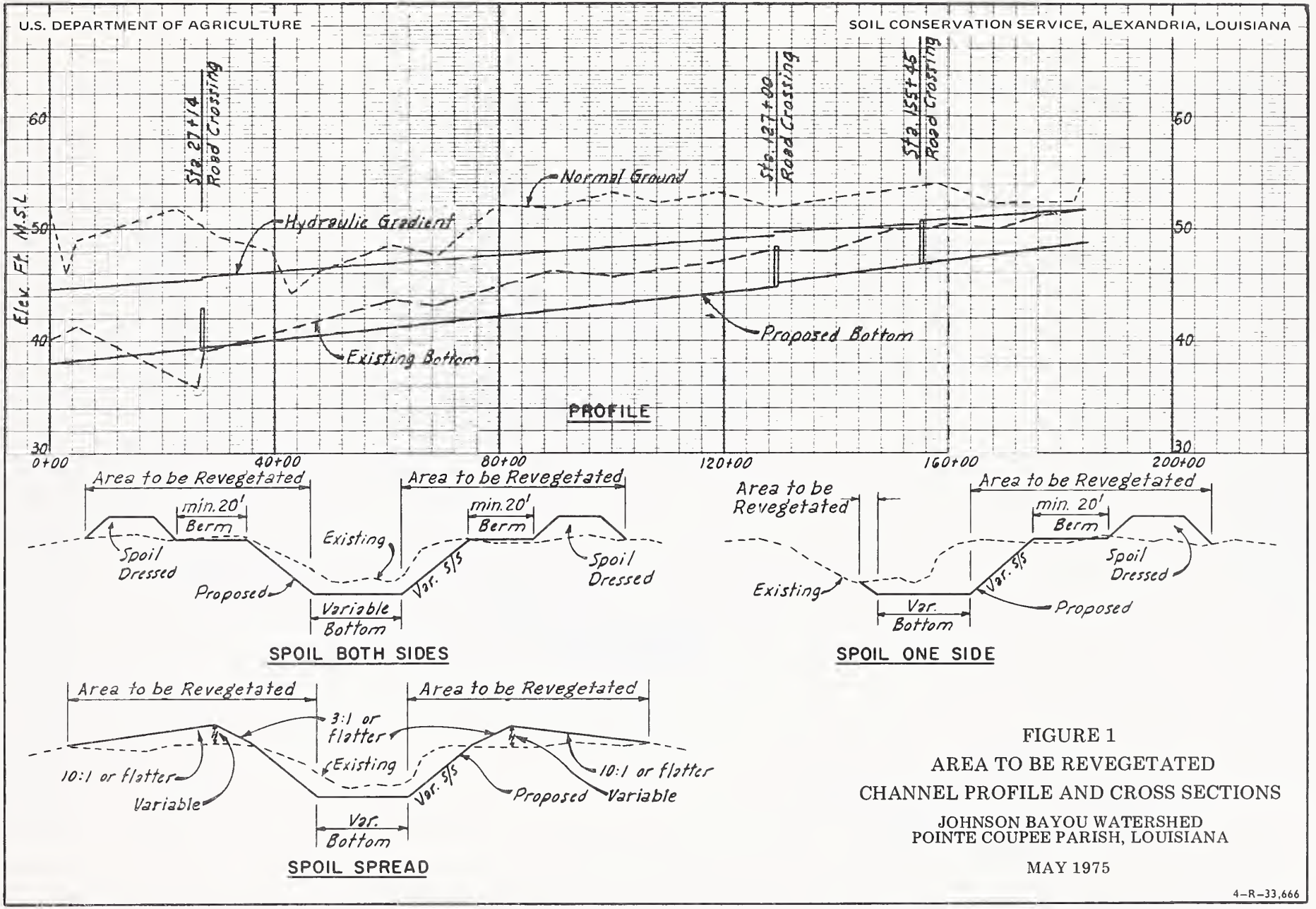


FIGURE 1

AREA TO BE REVEGETATED

CHANNEL PROFILE AND CROSS SECTIONS

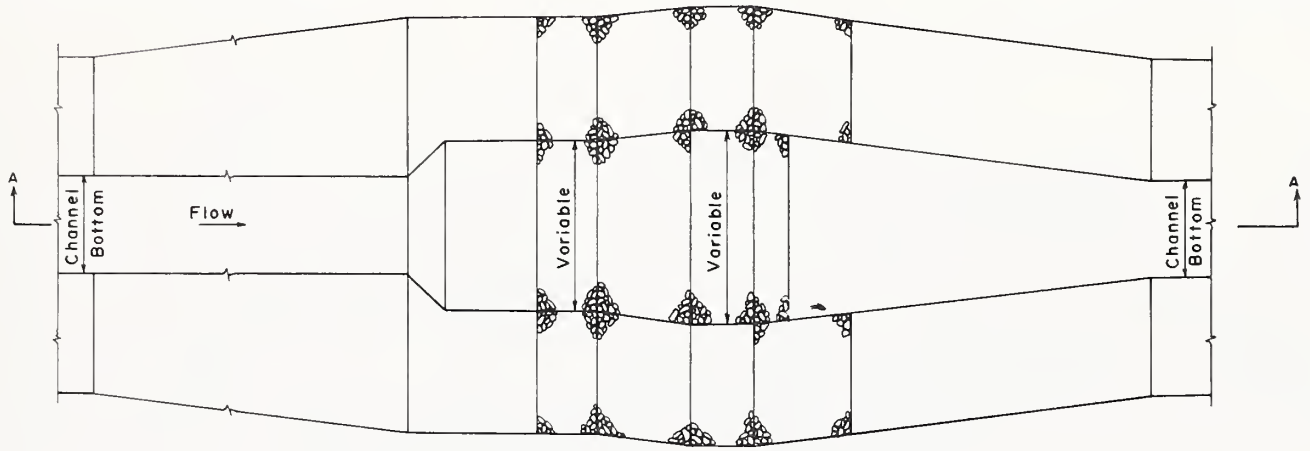
JOHNSON BAYOU WATERSHED
POINTE COUPEE PARISH, LOUISIANA

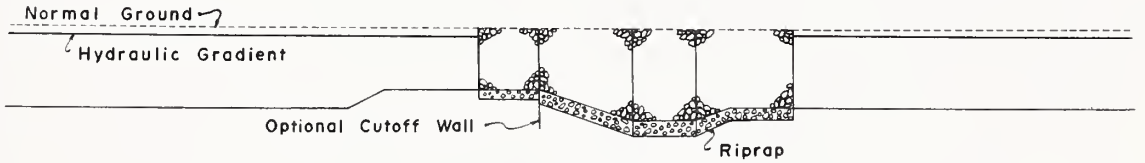
MAY 1975

4-R-33,666

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, ALEXANDRIA, LOUISIANA





SECTION A-A

FIGURE 2

STRUCTURE FOR WATER CONTROL (WEIR)

JOHNSON BAYOU WATERSHED
POINTE COUPEE PARISH, LOUISIANA

MAY 1975

4-R-33,982

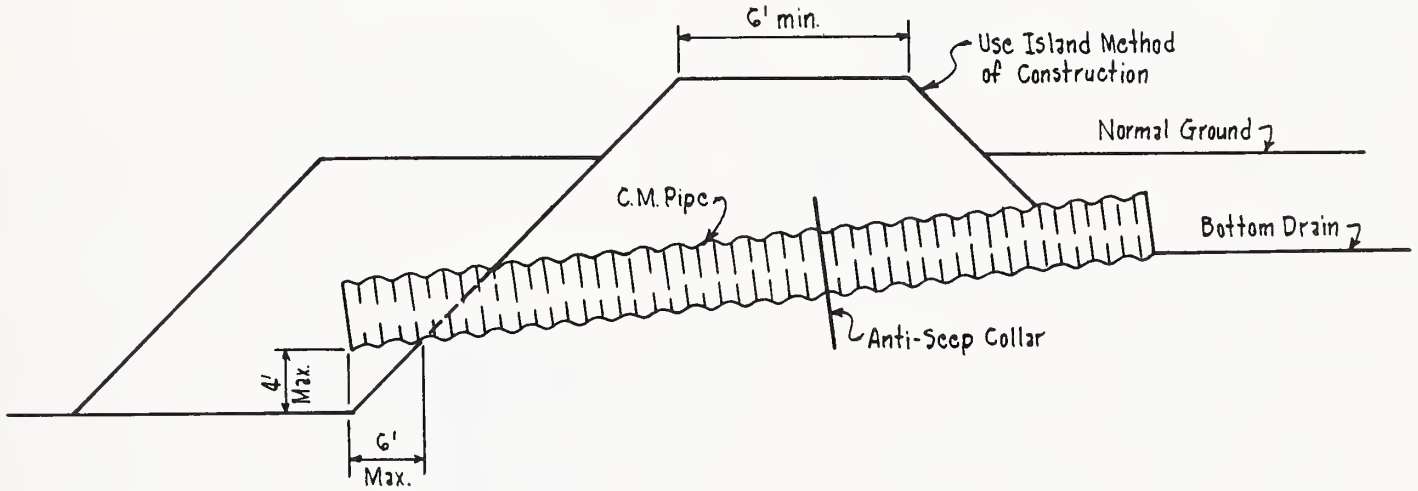


FIGURE 3

TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)

JOHNSON BAYOU WATERSHED
POINTE COUPEE PARISH, LOUISIANA

MAY 1975

4-R-33767

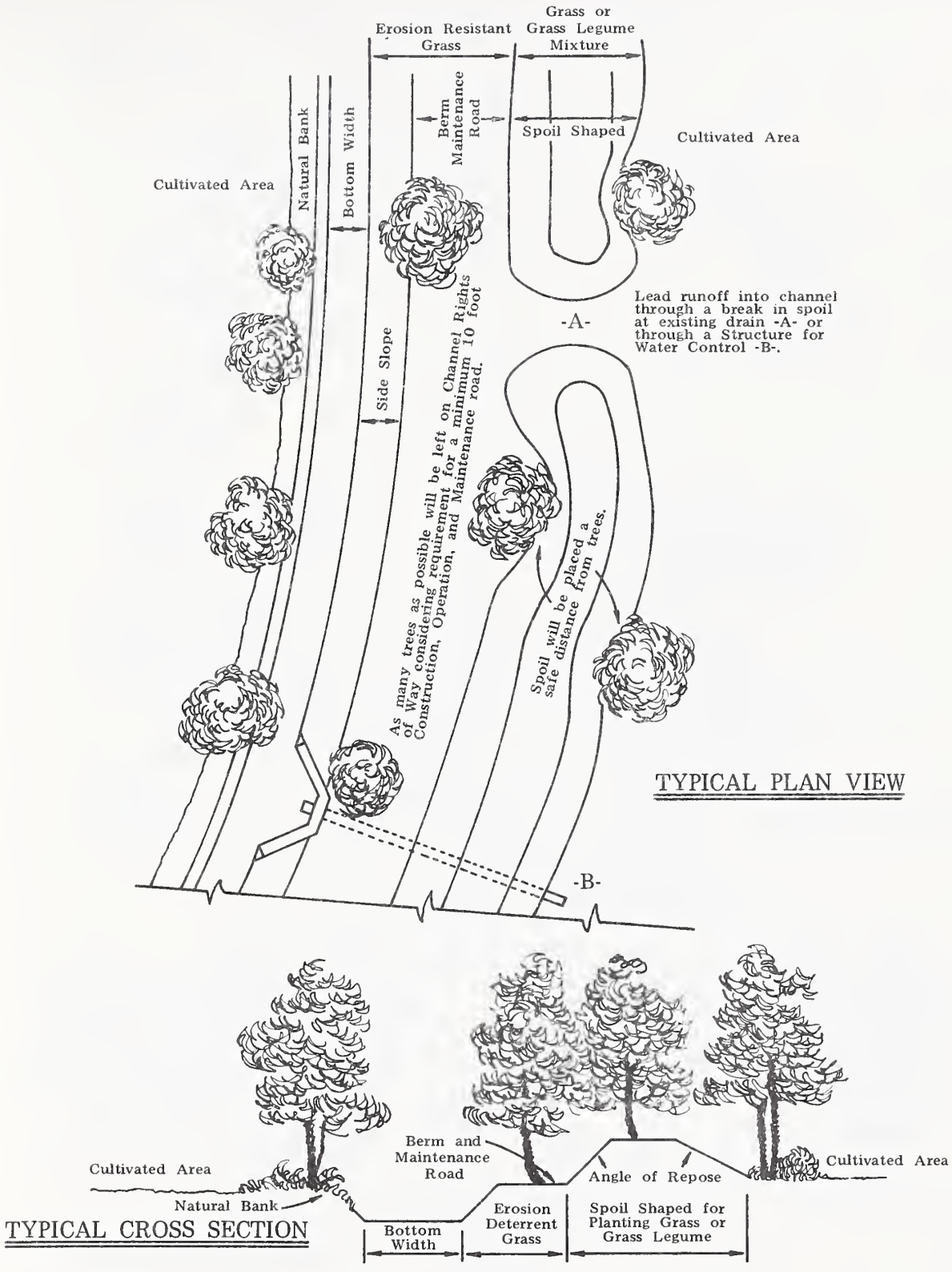


FIGURE 4

JOHNSON BAYOU WATERSHED
POINTE COUPEE PARISH, LOUISIANA

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS WHERE WOODY VEGETATION EXISTS ADJACENT TO CULTIVATED AREA

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

MAY 1975

USDA-SCS-FORT WORTH, TEX. 1975

4-L-34942 5-75

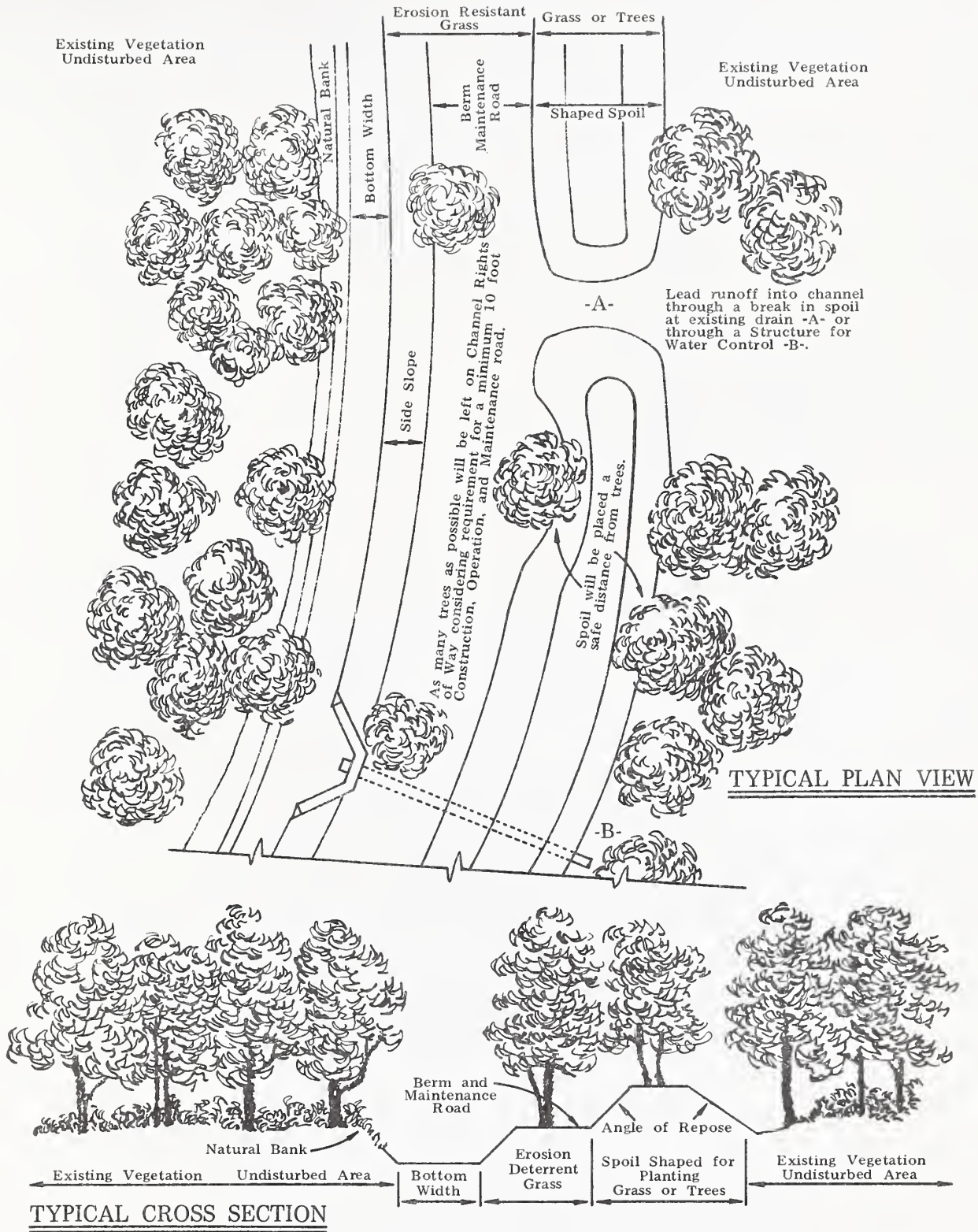


FIGURE 5

JOHNSON BAYOU WATERSHED
POINTE COUPEE PARISH, LOUISIANA

TYPICAL PLAN VIEW AND CROSS SECTION OF
CHANNELS THROUGH FOREST LAND

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

MAY 1975

USDA-SCS-FORT WORTH, TEX. 1975

4-L-34941 5-75

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, ALEXANDRIA, LOUISIANA

WEST FELICIANA PARISH

OLD RIVER

LOWER

R7E

R8E

PARISH

RIVER

ATCHAFALAYA

AVOYELLES

ST. LANDRY

T1S

T2S

T3S

T4S

Legonier

BLACK LAKE

Bayou

Morris

LOUISIANA AND ARKANSAS

TEXAS

Lettsworth

BIG LAKE MOREAU

PACIFIC

Thornton

Horse Bayou

Marine

Middle Corner

Buckhorn

Castle Lake

Robertson

Johnson

Innis

CONCORDIA PARISH

MISSISSIPPI - WEST FELICIANA PARISH - RIVER

RACCOURCI

OLD RIVER

FLOODWAY

MORGANZA

LIMIT OF

WEST

L-1M2, L-1M1, L-1K, L-1J1, L-1J, L-1I1B, L-1I1A, L-1I1, L-1I, L-1H1, L-1H, L-1I2, L-1I, L-1N1, L-1N1A, L-1N, L-1G1, L-1G2, L-1G, L-1F, L-1E, L-1D1, L-1D, L-1C1, L-1C, L-1B4, L-1B3, L-1B2, L-1B1, L-1B, L-1A, L-1B6A, L-1B6B, L-1B6, L-1B5, L-2D2, L-2D, L-2C, L-2B3A, L-2B3, L-2B2, L-2B1, L-2B, L-2A, L-2E2, L-2D1, L-2E, L-2F

M-1

I

II

LEGEND

- STATE HIGHWAY
- PARISH BOUNDARY
- RAILROAD
- DRAINAGE
- WATERSHED BOUNDARY (LEVEE)
- VILLAGE
- U.S. ARMY CORPS OF ENGINEERS STRUCTURE
- MULTIPURPOSE CHANNEL TO BE WORKED (EXCAVATION)
- ADEQUATE CHANNELS
- MULTIPURPOSE CHANNEL TO BE WORKED (CLEAR ONLY)
- EVALUATION UNIT BOUNDARY
- AREA BENEFITED
- STRUCTURE FOR WATER CONTROL (WEIR)
- U.S. ARMY CORPS OF ENGINEERS CHANNEL (BORROW PIT)
- U.S. ARMY CORPS OF ENGINEERS PLANNED-PUMPING PLANT

NOTE: LEVEE IS WATERSHED BOUNDARY

MORGANZA CONTROL STRUCTURE

LOUISIANA

Johnson Bayou Watershed

VICINITY MAP

Pointe Coupee Drainage Structure

N

Figure 6

PROJECT MAP

JOHNSON BAYOU WATERSHED

POINTE COUPEE PARISH, LOUISIANA

0 1 2 3 4 MILES

APPROXIMATE SCALE

COMPILED AND REPRODUCED AT 1:62,500 (1 INCH EQUALS .986 MILES) AND REPRODUCED AT T:99,200 (1 INCH EQUALS 1.565 MILES).

BASE COMPILED FROM USGS QUADRANGLE SHEETS.

SOURCE: Data compiled by SCS Watershed Planning Staff.

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